BUSINESS MANAGEMENT

Training and Service for Executive Work

Statistics and Quotas
***Control thru Charts*
***Control thru Reports*

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BUSINESS MANAGEMENT

Executive Manuals 76, 77 and 78

STATISTICS AND QUOTAS

—Being Executive Manual 76, on Accounting and Statistical Control, in a Complete Plan of Training and Service for Executive Work

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STATISTICS AND QUOTAS

Part I

Analyzing Statistical Data

THE progress of a business depends upon the ability of its executives to make correct decisions. Good judgment underlies correct decisions—and facts, not guesses or opinions, are the essential bases of good judgment.

The sales manager of a company who notes a decreasing trend in the sales of certain products wants to know why this is so. Have the salesmen been neglecting these products? Has there been a change in market conditions which brings about less need for them? If so, is this change in demand temporary or permanent? And so on.

He wants facts to help him decide what to do about it.

Or the treasurer of a company is faced with a period of unusually high credit losses. What is their ratio to sales? How do these losses compare with those sustained by other firms? What class or classes of accounts show the highest percentage of losses? What territories show the highest losses? He, too, wants facts.

To make sure of good judgment and sound decisions, management must have all pertinent facts upon which good judgment invariably rests.

Management to-day more than ever before wants facts and more facts—facts about general business conditions, about conditions in the industry and in the locality, about market conditions, and facts about all the elements of the business itself.

The business world has learned the value of complete and exact information on which to base its judgments, and the modern business man wants this information presented to him, as far as possible, in concise, statistical form, preferably tabulated or charted.

Both those who supply statistical facts and those who receive them and use them as the basis for judgment and decisions should understand how facts are gathered, analyzed and classified, summarized, and presented for practical uses. This executive manual will therefore cover the problem of gathering and using statistical facts in establishing quotas and schedules; and the following executive manual will clearly explain the use of charts as a means of presenting vital facts and trends, a knowledge of which is essential in the scientific control of a business.

Internal and External Statistics. There are two classes of statistics:

1. *Internal,* being facts and figures that come from inside the business.
2. *External,* facts and figures that come from outside the business but have a direct bearing upon the successful operation of the business.

Internal statistics are significant numerical facts which arise from the operation of the business itself, such as the volume of output, the number of workers, the units of output per worker, the kilowatt-hours required per day and per unit of output, the average length of time each class of goods is carried in stock, and so on. These and many other numerical facts give management the opportunity for intelligent control of operations.

External statistics embrace such facts as the current prices that are being quoted on needed materials and the trend of these prices; the volume of business that others are getting; increasing or decreasing interest rates; and the like.

In both classes, there is such a great variety of facts available that the problem of selecting those facts which will contribute most to effective control of a particular business, presents a difficult question.

Determining the Facts that Are Needed. The best procedure in selecting the facts for statistical compilations is to start by answering the question, "Just what do I want to know?"

It will help if the answer to this question is written out, for the exact purpose or use of the facts to be compiled should be *definitely* known—and this purpose or use should be sufficiently important to justify the expense of compiling the figures.

How useful does this information promise to be? Can it be obtained with sufficient accuracy to be useful, without excessive expense? Those also are leading questions. Sound judgment is required in answering them.

On this question of determining what statistics are required, one authority on statistical procedure says:

> You may think this all very simple and easy, but you will find it sometimes immensely difficult, and errors costly. No rules can be laid down, for every case is a matter for individual study and analysis. And it is right at this stage that so many make their first misstep. They become lost in the zest of hunting up and chasing down all the available related information; they allow themselves to be dragged off the scent of the fox by every jack rabbit that crosses the trail.
>
> When you find this happening to you, you will be able to recognize it by the bewildered sensation in your solar plexus the first time a friend drops in and asks in a heartless way, "What's the good of it?" And right there is a good time for you to stop—it would have been still better earlier—and ask yourself again, "What do I want to know?" Think back once more to your original position and what you set out to learn. If you find you are on the wrong track, bravely scrap the work you have done, tho it hurts to do so, and strike out again for your goal.
>
> Your goal is a certain piece of information. Statistics are merely the road to that information.

STATISTICS FROM EXTERNAL SOURCES

The business man of even a generation ago was forced to rely on estimates and a few meager statistics for data on which to base his judgment. Not so to-day. There is an amazing wealth of general statistical information at his command. His problem now is largely that of choosing the sources which will best meet his purpose.

SOME SOURCES OF BUSINESS STATISTICS

Federal Government publications:
- Statistical Abstract of the U. S. (annual) *Dept. of Commerce.*
- Survey of Current Business (monthly) *Dept. of Commerce.*
- Monthly Summary of Foreign Commerce of the U. S., *Dept. of Commerce.*
- U. S. Census Publications, *Bureau of the Census.*
- Agricultural Yearbook, *Dept. of Agriculture.*
- Weather, Crops, and Markets (weekly), *Dept. of Agriculture.*
- Monthly Labor Review, *Bureau of Labor Statistics.*
- Bureau of Mines bulletins, *Dept. of Interior.*
- Geological Survey bulletins, *Dept. of Interior.*
- Statistics of Railways (annual), *Interstate Commerce Commission.*
- Monthly bulletins on Railway Expenses and Traffic, *Interstate Commerce Commission.*
- And many valuable reports of departments and bureaus.

Federal Reserve Banks and other banks:
- Federal Reserve Bulletin (monthly), Washington.
- Monthly Review of Business Conditions, by each of the twelve Federal Reserve banks, covering conditions in its district.
- Monthly or occasional bulletins issued by other banks.

Statistics provided by states:
- Reports of various departments and bureaus covering labor statistics; automobile registrations; bank, insurance, and public-utility business; etc.

Statistics furnished by periodicals and newspapers:
- Bradstreet's, and Dun's Review (both weeklies).
- Commercial and Financial Chronical (weekly).
- Daily newspapers, some of which specialize in statistics.
- Annual "Almanacs," such as "World Almanac," "Chicago Daily News Almanac," etc.
- Special statistical studies (prepared to attract advertising). in each trade, such as "Iron Age."

Statistics published by trade and business associations:
- Information on Car Loadings (weekly) and Annual Bulletin, *American Ry. Association.*
- Information compiled by the many trade associations, local and state manufacturers' associations, chambers of commerce, stock and produce exchanges, boards of trade, etc.

Statistics compiled by special statistical organizations—
- Such as *Standard Statistics Co., Babson, Moody's Investors Service, Harvard Bureau of Economic Research, LaSalle Research Staff,* etc.

Figure 1. Some of the more important sources of business statistics.

The Federal Government departments—notably the Census Bureau and the Department of Commerce—offer a wealth of valuable numerical facts. So also do the Federal Reserve Banks, and many other banks. Many of the states compile and publish valuable data. The two large credit-rating agencies; most trade associations; many trade journals, magazines, and newspapers and several private statistical organizations are constantly compiling and publishing statistical information. The more important sources are suggested in the chart on the opposite page.

Thus in gathering needed facts from outside sources, it is seldom necessary to search out such facts at their sources. A reliable basis for judgment and statistical control in most businesses is afforded by comparisons with the carefully selected statistics that are now being published.

Control thru Comparisons with External Statistics. Valuable comparisons may be made between general statistical facts and the facts of our own business. The sales executive can tell whether his sales in a certain district compare well with the population of the district, or with its wealth, the number of automobiles registered in it, the output of its factories, the amount of fertilizer shipped into it, and so on. The treasurer makes his financing plans after studying the trend of money rates and noting the statistics regarding loanable funds, the trend of the volume and the prices of shares that change hands on the stock market, and similar outside facts. The works manager can study and compare local, state, and national employment figures before deciding on a wage policy. Thus—

> **General statistics obtained from outside sources offer the business man a basis for comparisons which can help him much in making many important decisions.**

THE INTERNAL STATISTICS OF A BUSINESS

External statistics cannot serve as a basis for accurate comparisons unless certain statistical facts, which are accurate *and comparable,* have been prepared by the business itself.

The Facts Compared Must Be Comparable. A common mistake in statistical procedure is to compare facts that are not logically comparable.

In certain wood-working industries, it is customary to charge the material-overhead-and-handling expense to the cost of the work, on the basis of the net board-feet in the finished product; but some companies figure this overhead charge on the total board-feet they buy—and they boast about their low overhead-burden rate in comparison with the rate of those who figure this rate the other way!

Again, a company may make a direct comparison between its sales for a five-week month and the industry's published figures for a thirty-day month; or it may compare the results accomplished during its fiscal year with the results accomplished by other companies during their fiscal years. Unless its fiscal year corresponds with those of the other companies, however, accurate comparisons are impossible.

A Uniform Unit of Measurement. Comparisons of certain ratios or results in an individual business with their averages for the industry are also often misleading.

The history of every movement toward unification of practice in an industry, for cost-finding and statistical purposes, reveals surprising variations in the units and methods used by different concerns in the industry. There are scores of "legal bushels," differing for the different goods measured and the different states in which the measuring is being done. There are two "tons" in common use and a third used occasionally. It is the practice in some cases to include the weight of the container when stating weights, in others to state only the net weights. Obviously, units of measurement must be alike for purposes of accurate comparison.

> **In every comparison of statistical facts, there must be a definite unit of measurement—a common denominator—and that unit must always be uniform and must be clearly defined.**

Comparisons of statistics are much like comparisons of fractions—there must be a common denominator. Until the *same* units are agreed upon and used *by all* who furnish statistical facts, calculations based on these facts lose much of their value. In compiling the internal statistics of a business, therefore, not only is the definition of the units used very important, but—

> **If the statistics of a business are to be compared with statistics external to the business, units of measurement and units of time, at which or during which the measurements are made, should be chosen to agree with those of the external statistics.**

Many facts of a business are useful alike for internal control and for comparison with other statistics. There is a mass of information which should be compiled about the details of the business—information that is usually presented in the form of departmental reports, production studies, etc. In compiling statistics of this class, each company can, of course, select its own units of time and measurement, being careful only that the same units are used in all the company's comparisons of statistical data. To use calendar months as units in the sales and shipping departments, and weeks as units in the shop, makes statistical comparisons difficult; for direct comparisons are then impossible.

How Exact Should Business Statistics Be? If statistics are to be useful they must be accurate. But how accurate?

Round figures are usually better for comparative purposes, because they are more easily grasped. While the accountant must always use exact figures, the statistician often presents his findings in round figures. When comparing the relative annual outputs of three large plants, the statistician can paint a much clearer picture by showing the outputs in thousands of pounds or tons than by giving figures which are the exact amounts. This applies, however, to presentation rather than to the compilation of the numerical facts.

> **Statistical compilations should usually employ exact figures, but the findings are often most useful when presented in round numbers.**

The form in which statistical information is presented is important for another reason:

> **A false appearance of accuracy is to be avoided.**

Suppose the sales department reports that 4,364 boxes of soap have been sold during the year to the dealers in a certain county. Suppose the census shows the population of this county as 136,472. It would be ridiculous to say that in this county the average consumption of this soap was .031977 of a box per inhabitant—the more so, since some of the soap may have gone into other counties; and the population has surely changed to some extent since the census was taken. A round figure, such as 32 boxes per thousand inhabitants, pictures the true situation more correctly—and much more usefully.

Here again, then, common sense is our guide; and it should be remembered that—

> **The degree of accuracy that is required will almost always affect the cost of getting statistical data.**

Suppose it were desirable to arrive at the cost per ton-mile of operating a firm's trucks during the month of February. To demand the weight, to a pound, of each package delivered that month, and also the distance, to a foot, that each package is carried, would be going too far—beyond the dictates of common sense. On the other hand, the shipping clerk's estimate of the weights carried and the average distances traveled might be a good guess, but it would not be statistical data.

A little clear thinking on the part of some one who is thoroly acquainted with the delivery situation and with the use to be made of the statistics, will suggest a method which will be amply accurate for the purpose, yet not too expensive. For example, a procedure may be worked out by which each truck will be weighed empty, and again, every time it leaves or enters the yards loaded. Speedometers installed on each truck will measure the total distance traveled. By such a convenient method, ton-mile figures of a sufficiently high degree of accuracy for purposes of comparison can be computed.

Compensating and Noncompensating Errors. The accuracy of the data we have just described will be high, even tho the scales are not particularly delicate and the tare not always exactly the same as when the empty trucks were weighed originally, provided the errors are over the correct weight as often as they are under it. Such deviations are known as "compensating errors," and the longer the list of figures which include these deviations from the correct figures, the more accurate will be the final result, since such errors tend to cancel each other.

If, on the other hand, the scales used weigh twenty pounds light in weighing empty trucks and are accurate in weighing loaded trucks, the percentage of error will obviously remain the same no matter how many figures are compiled. Such errors are known as noncompensating errors, and must be zealously avoided.

Sampling as a Basis for Statistics. Another way of determining the total ton-miles traveled by our trucks, and perhaps the most satisfactory way of all, is by "sampling." Suppose that each truck has a route of its own, traveling about the same distance and with roughly the same load every day. An observer could go out with each truck in turn, have its contents carefully weighed, and map the route it travels as a basis for computing the distance traveled. The record for this one day could be taken as a representative day's run for this truck, and averaged with the records of the other trucks.

While one truck may travel unusually far, or may carry an unusual load on its test day, another is as likely to go under its usual figures. Such errors are compensating; the final figure is not materially affected by them.

> **In sampling, each sample should be as nearly representative as possible, and enough samples should be taken so that errors and deviations will average out.**

Sampling, when carefully done, is satisfactory and economical. Instead of computing costs on every lot of identical parts run thru a shop, costs may be taken on an occasional lot, and the shop's performance gauged by this sample. An office need not check up on the speed with which it handles each order or letter, if occasionally an unannounced check is made on one day's orders or one day's mail. Several representative samples give an accurate basis for statistical comparisons.

Care Needed in Sampling. The accuracy of the statistics obtained thru sampling depends on whether the samples are truly representative. Obviously, a series of data which contains one very extraordinary item will be seriously misrepresentative if that item and just a few others are taken as samples. As the number of items sampled is increased, the adverse effect of the extraordinary item on the average is lessened, but its influence is still there to some extent.

> **In most kinds of statistical work, extraordinary and therefore unrepresentative samples should not be included in averaging the data.**

On the other hand, an item must not be excluded just because it is large or small, or, especially, just because the result obtained by including it does not tend to confirm a favored policy or practice. Personal bias is the foe of accuracy. If there is the slightest danger that bias may enter into the selection of samples, it is best to pick them purely at random. While the amount of error is small when a few unrepresentative samples are included in a large total number of samples, we must remember that any bias in selecting samples may multiply the number of unrepresentative samples and give a serious amount of noncompensating error.

Books have been written to describe the ways in which sampling should be done to make its results truly representative. Some of the methods are very complicated. Yet the gist of the matter is this:

> **Use good judgment and common sense in picking the sample data on which to base statistics; use enough samples to get a fair average; and don't let prejudice enter into their selection.**

SOURCES OF STATISTICS FOR A PARTICULAR BUSINESS

There are, generally speaking, three sources of data on which to base the statistical studies of any given business. These are—

1. The existing financial and departmental records.
2. Additional records and surveys of current operations and situations.
3. Special research activities.

Data Obtainable from the Records. The books of account, the files, and the departmental records supply a wealth of material for extensive and useful statistical study; yet, strange as it may seem, they are often overlooked. But to the man who knows how to tabulate and analyze the facts they contain, nearly all the existing records—the pay-roll records; the inventory records; the production, cost, sales, and purchasing records; and so on —are a source of statistical facts that are very valuable in controlling the operations of the business.

Sales records are particularly important. Usually they contain all the facts desired. But sometimes it is necessary to supplement the customary records. For example, a manufacturer of a small machine tool which was sold thru dealers, wanted to know what classes of users were the largest buyers of this tool. This product was delivered by the dealers to the users in original, unbroken crates. An addressed return postal card asking for the name, kind of business, and address of the user, was inclosed in each crate. Within a year or so, enough of these cards were returned to this manufacturer to give him fairly accurate information of the kind he wanted; and as more and more return cards come in, his ratings of various classes of users become more and more accurate.

Usually, however, the facts desired are to be found in the existing records, altho they may be in such forms as to make them unsuitable for statistical purposes. For example, exact comparisons of net selling prices may not be possible because, in the records, prepaid freight is included as part of the selling price. In such cases, a slight change in the form of record may be sufficient to save much work and make additional information readily available at very small or even no extra cost. A credit reporting agency found that its statistical work was greatly simplified by the typing of a key number on the copies of each order. This number told which salesman had made the sale and also the nature of the client's business.

Many business concerns route either the original orders or the shipping tickets thru a statistical department where all desired facts and figures are noted and tabulated. Later these facts are assembled and classified—often by means of tabulating machines, as explained in Executive Manual 59.

> **Efficient management has come to recognize the statistical as well as the accounting uses of business records, and has its forms designed to provide for both uses.**

Providing Additional Records. To answer the leading question, "Just what do I want to know?"—the question to be asked when starting a line of statistical inquiry —certain facts may be required which are not obtainable from the present records, as in the case of the tool manufacturer mentioned above.

Usually these new facts can be obtained along with the facts that are coming in, provided they are sought from the right sources in the right way. But additional records mean additional work, and the disturbance of the regular routine. It is not surprising, therefore, that the workers often fail to show enthusiasm in handling new records. Even tho the idea is sound and practical in every way, some one is likely to balk, mentally, if not openly, unless he has been sold on the worth-whileness of the additional records.

The statistician should sell the practical purposes of his work to the entire organization, to assure himself real co-operation in procuring reliable, accurate, and complete facts.

Where the members of the organization co-operate willingly, valuable new statistical data can be gained with little or no expense. Salesmen can and do bring in many worth-while facts which they observe out in the field. They are often asked to inquire into specific conditions —the crop conditions, the extent of unemployment, local credit situations, and the like. One large wholesale hardware company has so well trained its salesmen as observers of crop and business conditions that their reports on these matters serve as the basis of one of the most reliable surveys of general business and agricultural conditions now published in the United States.

Special Research Work. Some of the facts desired by management fall outside the scope of the current records of a business, and can be secured only by special research work—such facts as the ton-mile cost of trucking, the average of inventories carried by dealers in certain lines or items, the relative values of two or more locations for a retail store, etc.

Special research work does not necessarily call for elaborate and complicated methods and calculating machines. It may mean only a state of mind, a point of view, and still accomplish much. For instance, the proprietor of a small business who decides on a five-ton instead of a three-ton truck, after going over his cartage bills and shipping records and discussing his figures with friends who are using trucks, is carrying on statistical research as truly as is the oil refiner whose "scouts" keep him advised of every carload of competing oil that is distributed in every district in the market he covers.

The Scope of Research Work. Research work is as wide in scope as the boundaries of business itself. It is the scientific method of answering important questions with facts rather than with guesses or opinions. It embraces all statistical procedure. But it is always well for management to remember that—

> **Research work costs money; before it is undertaken, management must be satisfied that the results it promises to procure will prove profitable.**

Much expensive research work has been and is being done in "getting nowhere"; the money spent would bring more profitable results if expended in some other way, or saved. Good judgment is required in deciding upon the channels into which research work should be directed, and also in selecting economical methods of obtaining needed facts.

Much expensive duplication of effort in research work can often be avoided by employing special organizations which handle statistical research in certain fields. One organization, for example, will specialize on investigations concerning the attitude of workmen toward the company that employs them, another will make surveys which tell how well the customers of a public-service company are disposed toward it. And there are many organizations which have specially trained investigators and special facilities for doing valuable sales-research work.

In wisely selecting an outside research organization for any special job, it is well to check up the ability of the organization as to its methods, including such matters as its grasp of the principles of representative sampling, as explained in preceding pages.

Research work is often required in establishing the schedules and quotas by which a firm's sales and production plans are controlled. The consideration of that phase of statistical work is the subject of the second part of this manual. Before proceeding to this, however, one more phase of research work requires attention.

Research thru Mail Questionnaires. The questionnaire—asking for written answers to typed or printed questions—has often been used effectively in securing important facts. Almost every kind of statistics can be secured by the questionnaire method—if we have a list of men or organizations that have the information at hand, and if we know how to ask for it.

Asking for information is one thing; getting it is another. To frame an effective questionnaire requires as much skill as to write a sales letter. Restraint is needed—the fewer the questions asked, the more replies will be received. The questions should be brief and clear and as easy as possible to answer. If a question is long, it won't be read clear thru; and if it is at all ambiguous, many readers will misunderstand it. Selling skill is needed—to put the reader in a mood to respond. Skill in presenting the questions is needed—to get the kind of answers that will be most useful.

If the questions are answerable merely by check marks, the grade of replies will be better; and beginning a list with a few easy questions tends to induce the reader to answer any harder questions later on; for a man is inclined to finish a job once he has started it.

Questions should be so framed as to call for definite answers. Answers such as "Fair" and "Not very well" usually have little statistical value.

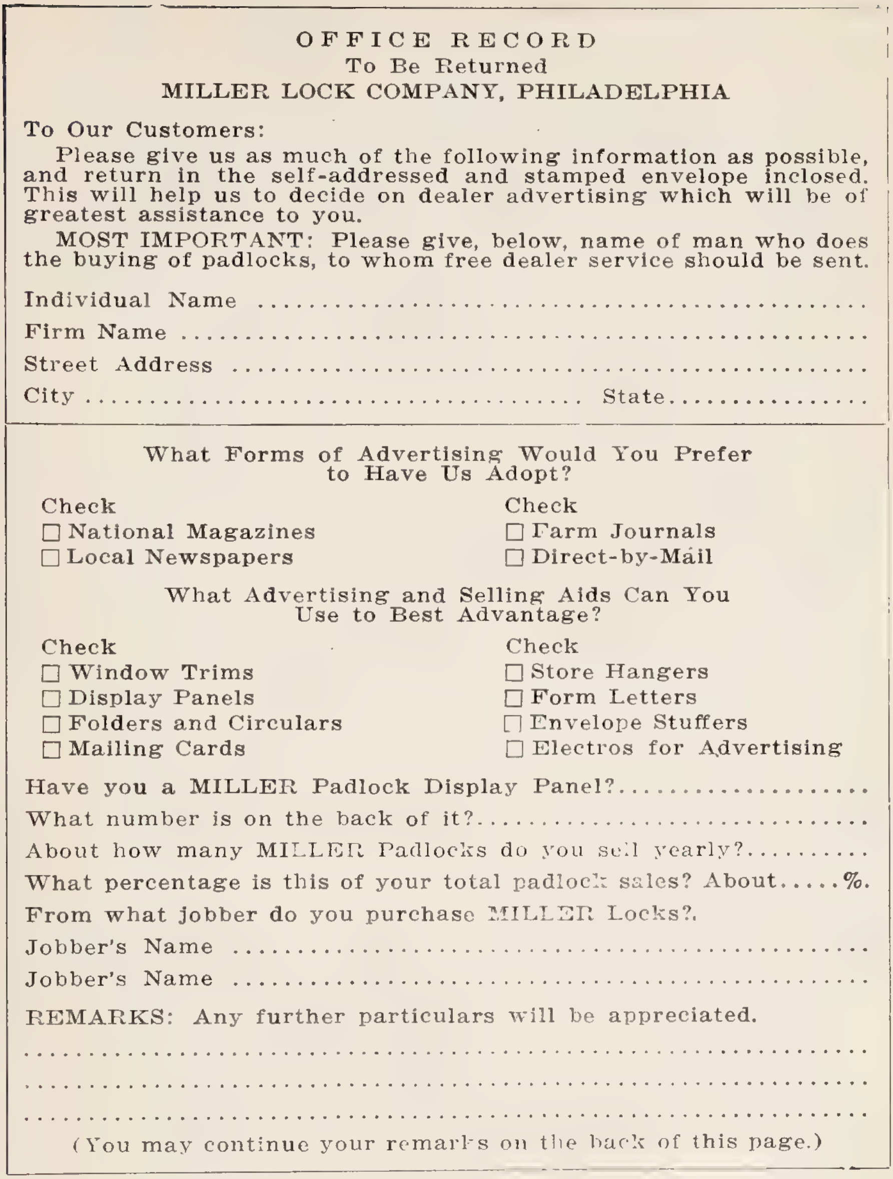
After the questionnaire and the selling letter which is to accompany it have been drafted, they should be studied together—studied from the viewpoint of the people who will be asked to give the information.

"If I myself were to receive this request, would I be convinced of the desirability of answering these questions?" That is the leading question in passing on the probable success of a questionnaire to be sent out. Is there anything in the letter or the questionnaire that is likely to arouse antagonism? Frankly, would you, an utter stranger, lay down your own engrossing work and go to the trouble of answering these questions? The very highest grade of salesmanship should be applied in asking for facts.

Analyzing the Answers to a Questionnaire. As the answers come in, they are tabulated, and the results are analyzed. Often a study of the answers reveals unexpected by-products of valuable information. One company found that the first replies received to a questionnaire which had been sent out to dealers showed a decided preference for national-magazine advertising, while replies received in the later mails favored co-operation in local advertising campaigns, or, under "Remarks," asked for extra discounts instead of advertising help.

The territory covered was limited, so the differences in the time the letters were on the road were inconsiderable. An examination of addresses showed that the earliest letters came from all over the territory. A careful analysis led to the conclusion, which further investigation confirmed, that the more businesslike dealers who answered their mail promptly, preferred national-advertising co-operation, while the dealers who did not appreciate this aid were of the type who were negligent in answering their mail.

A lock manufacturer, whose product was especially suited for doors of residences, sent out a questionnaire to



OFFICE RECORD
To Be Returned
MILLER LOCK COMPANY, PHILADELPHIA

To Our Customers:

Please give us as much of the following information as possible, and return in the self-addressed and stamped envelope inclosed. This will help us to decide on dealer advertising which will be of greatest assistance to you.

MOST IMPORTANT: Please give, below, name of man who does the buying of padlocks, to whom free dealer service should be sent.

Individual Name ....
Firm Name ....
Street Address ....
City .... State................

What Forms of Advertising Would You Prefer to Have Us Adopt?

Check
☐ National Magazines
☐ Local Newspapers

Check
☐ Farm Journals
☐ Direct-by-Mail

What Advertising and Selling Aids Can You Use to Best Advantage?

Check
☐ Window Trims
☐ Display Panels
☐ Folders and Circulars
☐ Mailing Cards

Check
☐ Store Hangers
☐ Form Letters
☐ Envelope Stuffers
☐ Electros for Advertising

Have you a MILLER Padlock Display Panel?..................
What number is on the back of it?..............................
About how many MILLER Padlocks do you sell yearly?..........
What percentage is this of your total padlock sales? About.....%.
From what jobber do you purchase MILLER Locks?.
Jobber's Name ....
Jobber's Name ....

REMARKS: Any further particulars will be appreciated.

....
....
....

(You may continue your remarks on the back of this page.)

Figure 2. A questionnaire designed to accomplish three purposes: (1) to secure names of buyers as a mailing list for a direct-to-dealer sales-aid service; (2) to get a statistical basis for decisions regarding the best use of the advertising appropriation; and (3) to get statistics regarding the relative sales of these padlocks by the different jobbers (a) in the different sections of the country, (b) in rural and urban communities, and (c) according to size of dealer (judged by credit rating). Since the dealers will not all reply, this is getting statistics by sampling.

dealers asking, among several other questions, what qualities were proving its best talking points. The answers brought out such points as its design and beauty, but, much to the manufacturer's amazement, nothing was said about a peculiar little catch which made the lock burglarproof and which was its most distinctive mark of superiority. Needless to say, he was able to use this information to advantage in planning his future advertising, in directing his salesmen's efforts, and in preparing dealer helps and other sales-promotion literature.

Negative results may be as important as positive results. A trade magazine followed the practice of starting its articles in the front of the magazine and concluding them in the back among the advertisements. Some readers complained, and the editors decided to find out by the questionnaire method whether or not the policy should be changed. When the replies were counted, it was found that a very large number of readers did not reply, altho a return card, addressed and stamped and requiring only a check mark, made answering very easy. This publisher concluded that most readers were not concerned one way or the other, and that a large number were satisfied to let things stand as they were.

* * * * * *

Part II of this executive manual shows how all the safeguards which help to make statistics accurate and useful must be brought into play in preparing quotas that will be a safe basis for the operating plans of a business.

STATISTICS AND QUOTAS

Part II

Quotas and Schedules

AN EASTERN manufacturer of a nationally distributed line of products had, during the past ten years, three different salesmen in one territory made up of Indiana and Ohio. The first of these three salesmen had made a fairly good job of introducing the line in this territory. The second had added about 10 per cent to the annual sales volume attained by the first salesman; and when the third salesman left the territory, he had added another 12 per cent.

The owner of the business now transferred one of his best salesmen to this territory and offered him a substantial commission on all sales over an amount based on previous sales. To the owner's amazement, this man ran sales up so far ahead of previous records that his commissions amounted to six times his salary!

Obviously, there had been greater sales possibilities in this territory all these years—possibilities which neither the management nor the former salesmen had realized. The manufacturer was suddenly brought face to face with the proof that he had passed up profits in this territory for ten years. This market could have been analyzed and quotas could have been set which would have measured the probable sales—thus giving a basis for controlling each salesman's work. Had this been done, sales could have been increased years before.

And what about the salesmen who had handled this territory? The first three men had felt satisfied with mediocre results from mediocre efforts, and had missed the man-building thrill of victory that comes thru reaching hard but attainable goals.

Quotas Are Goals in the Business Game. Previous sections of this training service have shown us how much management gains when the results it aims at are put into definite quota form.

> **Scientific management requires that the business as a whole and each worker in it have definite objectives —goals—marks to shoot at.**

Quotas are the marks which men aim to reach or attain. The collection manager may set up as his goal, the collection of 95 per cent of his accounts by their due dates. The office boy may make his, 175 letters per hour, folded, sealed, stamped, and ready to mail. The president may take, as one of the quotas which he strives to meet, the development of three high-caliber junior executives. Quotas hold before a man just what he must accomplish. They keep him pointed right. They add zest to his work. They make possible the reward of personal satisfaction for definite achievements—which are stepping-stones to still greater achievements. Quotas are an important means of applying the objective principle first explained in Executive Manual 1:

> **The man who gets there in business always knows definitely where "there" is.**

Quotas mean much to the management. They aid greatly in getting work done on schedule time. Let an enthusiastic assembly gang know that their quota for the day is 330 machines, with a reward of some sort for making it, and the machines are as good as in the shipping room. Let the credit department know that the financial program calls for collections of $38,000 by the 20th of the month, and, if the right spirit imbues the organization and the task is possible of performance, the treasurer need no longer worry where that sum is to come from.

Quotas for Management to Reach. Quota setting should not be confined to individuals, to groups, or to departments. Management should set quotas for itself also, such as: a $100,000 addition to surplus; a well-earned one-dollar increase in the dividend rate for the year; ten new automatic lathes each six months to replace less efficient machines; 1,400-unit-per-day output each working day of the year; a $50,000 increase in export sales.

> **When definite, well-considered quotas are established, and the responsibility for meeting them is given to the proper executives, management is thereby simplified and better control is assured.**

Quotas for the current periods may be considered controls by which management can check up on performance, bolster up weak spots, and plan ahead for new and bigger quotas that may be even more efficiently attained in the years to come.

Production quotas and schedules have been fully discussed in the manuals on Principles of Production. Financial quotas and schedules have been fully treated in the manuals on Financing a Business. The need for thoro-going analyses of product and market was emphasized in the section on Selling and Sales Management. Here in this part of our training service, we are ready to make a detailed analysis of the problem of setting sales quotas; for, as we saw in the previous manual—

> **Sales quotas are, as a rule, the basis for production and financial schedules, and therefore are of primary importance in all executive planning and control.**

Furthermore, there is no phase of quota setting that involves so much development and interpretation of statistics, external as well as internal statistics; no phase that calls for more accurate judgment in handling facts and in applying these facts to future working procedure.

The Threefold Usefulness of Sales Quotas. By setting fair sales quotas—fair goals to strive for—management does three things for the organization as a whole, and for its salesmen:

1. It stimulates wholesome competition between groups and between individuals.
2. It provides incentives to better individual and group efforts.
3. It lays the foundation for quota setting thruout the business.

Quotas are measuring rods by which management may ascertain what the departments and men are capable of doing and what they actually *are* doing. They may thus help in controlling output, in paying the workers fairly, in comparing performances, and in organizing contests between departments and individuals.

In the section on managing men, we saw the value of competition between sales offices and between salesmen. Such contests are made possible between all the parts of a sales organization, no matter how diverse their capacities and their territories, by putting all the work on a fair quota basis and using the percentage of accomplishment to determine the rank of the contestants.

Furthermore, a quota is the goal in each man's contest with himself. It helps the salesman to overcome those personal weaknesses which tend to keep his sales down, such as laziness and timidity. "Making the quota" satisfies his pride; in many companies it means membership in the "100% Club," with special privileges, or an extra commission, or a special bonus of some sort.

Quotas are also an incentive to group action; they provide a basis on which a group of men compete with their past efforts as a group, apart from their competition with other groups.

Finally, the total sales quota is a controlling element in determining the policies of the entire organization; for we know that the general budget, the various departmental budgets, and the financial budget should be based on what the company can reasonably expect to sell during the ensuing year. In other words, the year's total sales quota is, in most cases, the starting point in planning the year's work.

The Need of Accuracy and Fairness in Setting Quotas. Clearly, the use of quotas may do more harm than good if the quotas are inaccurate, if they favor some over others, or if they are not reasonably within reach. Give one district office a quota which is considered impossible of accomplishment, and its management and men say, "What's the use?" On the other hand, set a mark that can be reached without effort, and laziness is encouraged.

It is true that in the setting of a quota for the business as a whole, errors in setting individual quotas tend to cancel each other. And, as a matter of practice, the total quota is usually determined first, and then broken up into separate quotas for individuals, groups, territorial divisions, units of output, and lines. Accuracy, then, is of paramount importance in determining the total quota, for mistakes in the total quota are far-reaching in their effects and difficult to correct in the various individual quotas.

Failure to secure sufficient and accurate information on which to base the total sales quota, or inability to use this information—to "read the signs of the times"—may result in a disastrous mistake. A general misconstruction of the statistical data at hand just prior to and during the depression of 1920-21, for example, served to make conditions then worse than they otherwise would have been, because too many sales quotas were based on a demand which was transitory and artificially stimulated. Production was speeded up to meet this inflated demand and prices were sharply depressed by the market congestion that resulted from over-production.

Not infrequently the management of a company is overly optimistic regarding its ability to open new territories, and schedules sales quotas which cannot be met. When production is based on mistaken quotas, vigorous and expensive adjustments are usually required.

> **Unless quotas are accurately and fairly fixed, they are dangerous; they may result in great good—or in great harm.**

When quotas have been set which command the respect and confidence of all, the management has in them one of its most important means of control.

Scientific Quota Setting Is Practical. Some sales managers look askance at all statistical or scientific methods of setting quotas. They usually advocate some such method as that of adding a certain percentage to each salesman's last year's sales and calling this his quota. And this may not be a bad method in some cases, as where the market is already well developed and the annual growth in demand is well understood. But to advocate such a simple method of setting sales quotas for all businesses would be as unsound as to condemn, off-hand, all quotas based upon more elaborate statistical compilations.

It is probably true that absolute exactness and fairness in setting sales quotas is unattainable. Yet many executives are setting quotas which prove so accurate that all the plans of the business may be safely based on them; we should understand the principles they follow in setting quotas.

THE MAIN FACTORS IN SETTING QUOTAS

Quotas that are really an aid to management in properly controlling sales and output are the product of statistical work guided and controlled by common sense. There is no royal road to success—no exact mathematical formula—in quota setting. No calculating machine will automatically grind out the desired quotas.

> **It takes careful fact-finding and comprehensive thinking to set accurate quotas, for many factors are involved and the weight that should be given to each factor is never exactly the same.**

Let us examine the most important of these factors.

How Business Conditions Affect Sales Quotas. First, the condition of business in general has an important bearing upon sales quotas. If all signs point to improvement in general business, it is reasonable to expect an increase in sales. But before that expectation is stated as a definite percentage of increase, it is best to study the relation of the company's line of business to general business conditions. They do not always follow parallel paths.

Common-sense thinking and a study of the past history of the relationship between trends in the business and trends in general business conditions are necessary. Do sales in this line ordinarily fall off a few months ahead of a decline of sales in general, as with silk, or some months later, as with the movies, for which people seem to have more time when work is scarce?

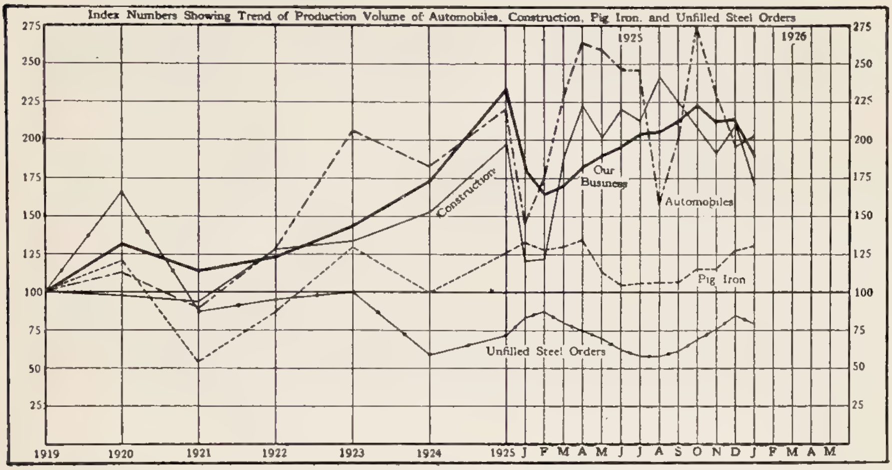


Figure 3. The progress of a company's business compared with the trends of the industry and with the trend of general business. The volume of production of an automobile-parts manufacturer is shown by the heavy solid line which is drawn on the chart of production indexes shown in the *LaSalle Business Bulletin.* A direct comparison can be made between the progress of this business(designated on the chart as "Our Business") and the number of automobiles manufactured. Helpful comparisons can also be made with the three other production indexes. It is evident that, except during 1923, the trend of this business has followed that of the automobile business very closely.

The prospects of business in the particular line should therefore be analyzed carefully, especially with regard to conditions in those lines with which it is most directly related. For this purpose, newspapers, periodicals, trade-association reports, trade journals, government reports, and the company's own observations all may afford valuable facts.

The close interdependence of businesses in related lines of industry is an important factor. General business conditions should not be given undue weight in calculating prospective demand. Proper emphasis must be placed on conditions in those lines which are most closely related to our own. The agricultural-implement business, for instance, was much slower than most lines in recuperating from the depression of 1921, because farm conditions did not improve as fast as general business conditions. The fertilizer industry lagged even farther behind.

On the other side of the picture, we have the building-construction industry which enjoyed remarkable prosperity even during the minor reactions of general business in the years following 1921. Manufacturers of building materials would have been wrong in basing their sales quotas mainly on an appraisal of general business conditions during this period.

A study of all the important business indicators, as explained in Executive Manuals 3 and 4, and an assignment of correct weights to these indicators (as determined by their relative influence on *our* particular business) will usually afford us sufficiently definite information so that we can say with some confidence that trade in our line, during the next few months or a year, should be approximately a certain percentage above or below normal. But what would be the "normal" trade in our line this year? This depends on the trend of demand.

Trends of Demand. Most important in determining the more permanent sales and production policies, is the trend of demand in the industry. Is it increasing at a very fast rate, such as the rapid growth in the demand for radios in 1923 and 1924? Is it growing at the definitely measurable rate, such as the growth of demand for telephones? Does the rate of growth parallel the growth in population? Or is the trend of the industry downward, as in the harness and wagon trades?

Each industry has a definite trend of growth in the demand for its products, and this trend should be recognized in setting quotas for a particular business.

The method of determining trends will be described in the next manual.

The Causes of Trends. The trend of demand for an industry as a whole can be traced to causes which are usually beyond control, but not always. The "Eat more raisins" advertising campaign caused the trend of demand for this fruit to shoot upward; and the paint campaign, "Save the surface and you save all," has had a marked influence on the domestic paint demand.

Those two controlled increases in trends happen to have caused little or no change in the trends of other industries, but this is not always the case. Should a "Use more corn" campaign cause an appreciable increase in the use of corn meal, the trend in the use of wheat flour would inevitably be adversely affected, just as the trend in the growth of the furniture industry was for a time adversely affected by the rapid increase in the use of automobiles. Automobiles took people out of the house; the need and desire for new furniture was overshadowed by new interests, and money which otherwise would have been spent on home furnishings was diverted to the purchase and maintenance of pleasure cars.

All these interrelated trends have their effects on sales and on the quotas that should be established. General statistics and the statistics of many industries must be carefully studied to determine the trends of demand, and from them to determine the departures from "normal." Thus, we can set up the "normal" of our own particular business, and can relate anticipated results to this "normal" by estimating the influence of trends in business generally, in affiliated and competitive lines, and in our own industry.

Competition and Its Relation to Quotas. When it comes to analyzing trends in our own industry and studying the effect of these trends in our own business, we are brought face to face with the important factor of competition. Few businesses are without the healthy but often unwelcome influence of competitors.

Is our business growing strong, so that its sales are increasing more rapidly than competitors' sales? If so, the total quota for our business must be increased by a percentage greater than that for the whole industry. Or is the business standing still even tho the trend of the industry is upward? Then the trend figures must be discounted, for, relatively, this particular concern is going backward; and, before the next years' quotas are set, it would be well to make a searching comparison of the statistics for the industry, and for our own concern, to determine why and where competitors are making the greater strides. Perhaps a readjustment of quotas will help to build up the company's sales.

SETTING THE TOTAL QUOTA FOR THE BUSINESS

The factors just mentioned are important considerations that help in determining by how much more (or less) than this year's sales should be the total quota for the coming year or other period. (For purposes of simplification, we shall speak of *annual* quotas and schedules, altho in many lines of business, it is more satisfactory to set quotas for shorter periods; however, the basic principles of quota setting are the same in any case, and practical methods may be worked out from these principles in setting quotas for a period of any desired length.)

In most cases the quota, after being tentatively fixed, is next divided among the different territories. Then each territorial quota is examined separately in order to determine the influence of the principal factors (business conditions, market trends, and competition) in each territory. From a consideration of the special factors in each territory, needed revisions are made in the territorial quotas. The sum total of these separate and adjusted territorial quotas (usually with a "factor-of-safety" deduction to allow for contingencies) then becomes the established quota for the business for the year.

Announced Quotas versus Actual Expectations. Very sound judgment is required in handling quotas from the management point of view; for sometimes the purposes of quota setting conflict. If management foresees a decline in sales volume due to causes beyond its control, it must plan accordingly. It may take steps to lower costs, to purchase in smaller quantities, to increase sales efforts, to tighten up on collections. But it must also consider the morale of its personnel, especially of its sales personnel. Here is a conflict between the control purposes of quotas. If it lowers sales quotas materially, it suggests to its salesmen that business is going to be bad; that no matter how hard they work, the cards are stacked against them. If it increases quotas in the face of an imminent slump, it merely accentuates the decline—throws it into sharp relief; for quotas must be attainable.

Under such conditions, management must take a middle ground. Its announced sales quotas will be neither as low as predictions warrant, nor as high as to be unattainable. A safe procedure is to set the quotas fairly in line with the quotas for a normal year. If sales for the preceding period were unusually large, due to abnormally good conditions, the salesmen should be made to recognize this fact. Lowering the quota after an abnormal year need not be dangerous to morale nor to sales efficiency, if management explains conditions to the salesmen. In fact, such an explanation is desirable, to prevent overconfidence and lax sales methods from creeping in.

But where subnormal conditions are anticipated, it is not unfair to call for unusual efforts from everyone in the organization, and setting the sales quota at a normal figure will tend to offset the effects of outside factors by stimulating the human factors inside the business to greater efficiency. It is, of course, imperative that salesmen be prevented from becoming pessimistic. The announcing of *reasonable* quotas, even where they are higher than the actual anticipations of management, is often sound sales psychology.

Yet if the management were to base the entire year's production program on these optimistic sales quotas, embarrassing complications might result. In such circumstances it is desirable either to ignore the announced sales quotas in estimating the probable total sales for the coming year, or to plan a conservative production program to provide for the sales planned for the next two or three months, and then await developments.

SETTING THE TERRITORIAL QUOTAS

Determining the volume of goods that the company can reasonably expect to sell in each territory requires a detailed statistical analysis of conditions in each territory. Especially is this true if separate quotas are to be set for more than one product, and if the sales divisions are numerous. Many companies, however, have adopted these detailed quotas and now find them indispensable in controlling their sales work. Every salesman's territory is analyzed, and every man is assigned a definite volume of sales on each class of product.

And these quotas are being met, altho, of course, any one salesman will rarely sell his exact quota for each product. However, the variations tend to average out, so that production and purchasing schedules can be made, with very fair assurance, for three months, six months, or a year in advance.

The more important factors that affect territorial quotas fall into two general classes:

1. The active, present demand.
2. The potential demand.

The Known Active Demand. We have already seen that the known active demand is the starting point in setting quotas. In most cases, this demand is very easy to determine from the sales records. Especially is this true of a staple article which has been marketed in the territory for some time. If people have been buying it steadily, it is reasonable to anticipate that, under a continuance of virtually the same conditions, the same sales effort will result in about the same sales during the coming year.

> **The actual sales statistics, with the indication they give of the active demand in each territory, almost always form the starting point in determining the territorial quotas.**

The Effect of Community Prosperity. A variable which is always affecting the active demand in a territory is the degree of prosperity within the territorial area. This must of course be considered from the viewpoint of the probabilities for the entire year. While the effect of this factor is much greater in lines of products which are classified as luxuries or as semi-luxuries, even the necessities of life are also used more sparingly when the income of the community falls off. A study of the company's statistics will usually give a working basis for telling to what extent sales in its line are affected by changes in conditions, such as changes in employment conditions among the people who compose the market for the company's products.

> **Changes in local business conditions have some effect upon the active demand for all goods, staples as well specialties; and this effect must be carefully anticipated when fixing sales quotas.**

What Potential Demand Is. A manufacturer of a roofing material which was sold largely to replace shingle roofs, decided to assign each of his licensed dealers a quota; and planned to withdraw the license from all who did not sell at least 75 per cent of their quotas. The quota of each dealer was set 10 per cent higher than his last year's sales.

No sooner had this announcement gone out than complaints flooded the office. Typical of these complaints is the following extract from one letter:

> Do you know what you are doing to me? Here I made a special drive last year and put new roofing on nearly every shingle roof in my town and on practically every farmer's home and barn. So there are now few prospects left in the territory I cover. Yet you tell me if I don't sell as much roofing as I did last year, you'll let somebody else sell your roofing for the new houses and barns that go up this year. Is that fair?

This roofing manufacturer's sales were near the point of potential demand in that community. An attempt to increase the volume of sales over last year's would have been unprofitable, both to the manufacturer and the dealer.

> **There is—for every product in every community—a point beyond which sales cannot be pushed except at so great an effort and expense as to make the increase in sales unprofitable; this point measures the practical potential demand.**

In some staple lines, such as salt, collar buttons, and gasoline, the total active demand is always at or near the point of potential demand, for the public buys all it has use for. In these lines, one company's increase in sales, over and above the increase in community demand, must mean a relative decrease in competitors' sales. In setting quotas in such lines as these, there are certain important questions:

Will the effort to increase sales at the expense of competitors require such high-pressure methods as to be unduly expensive, and is it likely to lead competition to adopt retaliatory measures? Is it likely that bigger profits can be gained more surely, not by a high-pressure drive for more sales, but by lowering costs, or adding new products to the line, or developing new markets?

Very generally speaking, the businesses that show unusual profits thruout the next decades are likely to do so because they are best able to hold down their marketing as well as their producing costs. (How to lower marketing costs was fully covered in the sections on selling and sales management and on advertising and marketing; while the problem of securing low-cost production was covered in principles of production.)

Needless to say, the point of potential demand is, in all lines of business, an elusive quantity. It changes with the tides of public sentiment, with changes in economic conditions, and with the shifts in population. The demand is lowered if a substitute device or service is offered as an improvement; it can be raised if new uses for the goods can be devised and if the public can be economically persuaded to adopt the new uses.

Yet, since the potential demand for goods in any given territory gives a basis for estimating how much we may expect to sell in that territory, we may say that—

> **The measurement of the potential demand in each territory is one of the most important subjects of statistical investigation, and is always necessary if reliable quotas are to be established.**

Measuring the Potential Demand. It requires considerable ingenuity to devise an accurate yet not too expensive method of estimating the potential demand in any given market, for potential demand can seldom be directly measured. Even if it could be directly and exactly measured, this would, in all probability, cost more than a sales campaign, for it would require that the needs of each possible prospect be determined. Instead, a search is made for statistics which are already available and on which a fair estimate of the potential demand in a given market can be based.

In some cases, the basis for estimating potential demand is easy to determine. Chewing gum, for example, is not confined to any particular class of people, and few would refrain from buying it because of its cost. Therefore, the population of a community is a fair basis for measuring the potential demand for chewing gum. Not so with portable typewriters. Many people who can afford to buy one have no use for it; many others would like to have one, but they can't afford it. After considerable research, the Corona Typewriter Co. found that the purchasers of their machines were of the same class as the readers of a widely distributed weekly magazine of large circulation. They proceeded to work out their sales quotas on the basis of this periodical's circulation figures —distributing the quotas by communities according to a predetermined proportion of this national periodical's circulation figures for each community; and the plan has worked satisfactorily.

> **In measuring potential demand, it is necessary to determine what type, or types, of consumers buy the goods or services, and then to determine the numbers and the needs of these consumers in each sales division.**

The number of banks in a community and their total deposits may be used to measure the demand for certain kinds of bank supplies. The numbers of automobiles of the various makes—registration figures for which can be obtained from the public records—tell us much about the potential market in the auto accessory and supply lines. Railroad purchases of steel rails is a statistical indicator of the extent and location of the potential market for track-laying tools.

Thus, there are many kinds of statistics that serve as indexes for determining potential demand within specified territories. When related to the strength of competition in the territory, potential demand, thus measured, becomes a fundamental consideration in fixing sales quotas.

An Index Is Needed to Relate Sales to Statistics. After having chosen certain rather easily ascertained statistics which are known to be proportional to the demand for our product in the territories we cover, we must determine the exact ratio of this relationship. For example, let us say that we are basing the demand for our product, chewing gum, on population figures. Then, should we expect our gum to be bought at the rate of one box a year for every ten, every fifty, or every thousand of the population?

One way of determining this ratio is this: If the management is satisfied that sales in certain representative territories are all that can reasonably be expected from such territories, the sales and the chosen statistics for these territories are compared and the ratio between the volume of sales and the corresponding statistical data is adopted as the standard ratio or index for our whole market. For example, suppose the statistical base for the sale of a certain product is the number of retail dealers. Suppose we find that the purchases of 32 dealers in three well-developed, representative districts, total consistently about $14,500 worth of our goods per year. We thus arrive at an index figure of $450 per average dealer. For a territory with 100 prospective dealers for our goods, we multiply our statistical base by our index number and get a quota of $45,000 a year in that territory.

> **The theoretical quota for any sales unit is obtained by multiplying the base figure of the chosen statistics, by the index number which represents the ratio between the carefully ascertained potential demand in a representative territory and our own statistical base figure for that territory.**

In some cases, this theoretical quota for the territory can be considered final. In most cases, however, the territory must be studied to determine whether certain circumstances require a change in the theoretical quota.

Basing the Quotas on Research Work. It is seldom safe to assume that *any* territory has been so carefully worked as to represent the utmost sales that can be expected from it or from any equivalent territory. Careful sales research is usually necessary to determine the sales possibilities of any representative market area. And, of course, when new sales policies are being followed or when a new product is introduced, old results are comparatively valueless.

Test sales campaigns are used in all such cases to measure the amounts that can be sold. This is really a form of sampling, and all the precautions to be observed in sampling, as explained in Part I of this manual, apply:

> **1. The territories chosen for the test sales campaigns must be truly representative; and the tests must be made under exactly the conditions which will obtain in the larger sales campaigns later. If this is impossible, due allowances must be made.**

This requirement is difficult to meet. The test territories should be well scattered to eliminate purely local peculiarities; they should average no better and no worse in wealth, transportation facilities, etc., than the rest of the territories. And the men sent out to do the testing should be salesmen of average ability and experience in the line. Furthermore, the tests should last long enough to give the men time to "hit their stride," and the results should not be used until they do have time to "get going."

> **2. Avoid all personal bias.**

Personal bias is a difficult factor to deal with. The originator of a new plan should seldom be asked to test it out. There are two important risks: He may be prone to excuse any disappointing results; or he may so fire the investigators with his enthusiasms that they rise above themselves and produce unusual results.

> **3. The test must be sufficiently extensive to give truly representative results.**

Often serious mistakes result from spotty tests here and there in the territory. The best procedure in the "sample" method of testing a market is to continue the sampling process until the latest results, as they are averaged in with the earlier results, are found to leave the general average unchanged. We can then safely assume that the results are representative of the sections and conditions tested.

Allowing for Seasonal Variation. Past experience as revealed by the sales records will show what proportion of the year's business is likely to be sold in each month of the year and the quotas will be divided into monthly or seasonal quotas. Figures 4 and 5 show how this is done.

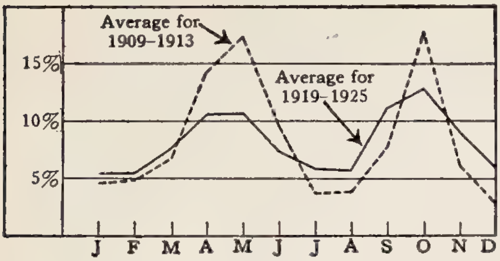


Figure 4. Percentage of annual sales sold during each month of the year. The heavy full line shows the average percentage of business done by months for the years 1919 to 1925, but omitting 1920 and 1922. The way in which this average was found is shown in Figure 5. The light dotted line shows the similar average for the period 1909-1913. The marked change in buying, from the former seasonal stocking-up to the present hand-to-mouth buying is well illustrated here.

In businesses that enjoy a widespread distribution, the seasonal variations are not the same in all sections. In such cases, it is necessary to compute the monthly quotas for the business by totalling the separate quotas of the various districts. It is in these total monthly quotas that the factory is interested when planning its production schedule, and the treasurer in planning his financial schedule.

Schedules Are Based on Quotas. When the sales department's requirements for each month are known, the factory can plan to have goods in stock just when they are wanted, and the current financial needs also can be anticipated and met. (Executive Problem 46 has given us some practical experience in working out both these schedules.)

You will recall the certainty of control and the economy in operation that result when these schedules are definite, and are so carefully worked out that actual sales and actual collections are in close agreement with the scheduled results.

The basis for quotas should be so well determined, and all the variables should be considered with such

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1909	5.2	5.4	5.5	15.1	16.4	10.4	3.6	3.3	7.1	17.7	7.2	2.9	100
1910	4.2	5.3	6.6	12.9	19.2	7.0	3.8	3.6	11.8	16.2	6.1	3.3	100
1911	3.1	4.7	7.3	14.2	17.9	6.0	5.6	4.8	10.6	19.1	5.5	1.2	100
1912	4.6	4.6	6.6	15.9	15.7	14.2	2.5	4.8	5.4	18.8	4.3	2.6	100
1913	5.7	4.3	9.2	14.6	16.1	10.8	3.3	3.1	4.3	16.9	7.7	4.0	100
	(The war years were not representative and are therefore omitted.)												
1919	6.1	6.2	8.3	10.3	10.2	7.7	6.2	6.4	10.8	12.7	8.9	6.2	100
1920	(Not representative and therefore not included.)												
1921	5.5	4.9	8.5	11.5	10.1	7.7	5.9	6.0	11.2	14.2	9.5	5.0	100
~~1922~~	~~6.2~~	~~13.2~~	~~5.8~~	~~12.0~~	~~11.6~~	~~3.9~~	~~2.7~~	~~4.2~~	~~9.2~~	~~12.0~~	~~8.3~~	~~10.9~~	~~100~~
1923	7.0	6.8	7.6	9.7	12.3	6.2	7.2	4.8	10.9	13.1	9.0	5.4	100
1924	4.0	4.6	8.0	10.9	10.1	6.8	6.7	8.0	12.2	13.0	8.8	6.9	100
1925	5.4	5.7	7.9	11.6	10.8	8.7	4.9	4.7	11.9	13.3	8.8	6.3	100
Total for 1919, 1921, 1923–1925	28.0	28.2	40.3	54.0	53.5	37.1	30.9	29.9	57.0	66.3	45.0	29.8	500
Average	5.6	5.6	8.0	10 8	10.7	7.4	6.2	6.0	11.4	13.3	9.0	6.0	100

Figure 5. Determining the seasonal variations in quotas. The method by which the annual quota is divided into monthly quotas which take the seasonal variation of demand into account, is shown in the above table. As a first step, the story of the sales of the company is considered for several years back. Have some years been characterized by abnormal conditions which make sales unrepresentative? Then such years should be omitted from the computation, as was done here with the years 1914-1918 and 1920. As a second step, the sales for each month are divided by the total sales for that year, thus determining what percentage of business was done in each month.

As a third step, all the percentages are scrutinized to see whether some years appear seriously out of line; the story of these years will then determine whether they should be dropped from the table or not. (You will notice that the year 1922 proved unsuitable for averaging.)

In the fourth place, the column of figures for each month should be carefully examined for any evidence of change in buying habits. In many lines there has been a marked change in buying habits since the War; where formerly once-a-year or twice-a-year buying prevailed, buying is done on a hand-to-mouth basis. When such changes have occurred, only the later years which reflect present-day tendencies can be used in the table. It is because of the evident change in buying habits that the earlier years are omitted in computing the above averages.

Once we are satisfied that the statistical data is representative, our work is nearly done. We add the percentage column for each month and divide by the number of items that go into each total, and get the average percentage of sales which experience shows should be expected each month. We can then divide our total annual quota accordingly—unless the evidence of a trend is so conclusive that we feel warranted in adjusting our monthly percentages to fit future rather than past conditions.

accuracy and foresight that the quotas will work out in actual sales performance.

USING THE QUOTAS AS CONTROLS

It would be unwise to set quotas and then wait until the end of the year to check up on the way they are working out. The reason for having weekly or monthly quotas is, in part, to give the men a means of constantly measuring how nearly they are meeting the year's quota. The weekly or monthly quotas also give the management a current check on the way the sales plans are working out. This is done, as a rule, by the charting of sales for each district and for the business as a whole, alongside the quotas that have been assigned.

Comparing Results with the Estimates. Two forms of charts commonly used for this purpose are shown in Figures 6 and 7. Figure 6 shows the monthly quotas that have been assigned to a district sales office and also the actual sales for seven months of the year. Quotas and sales are shown by months and also cumulatively—that is, the sum of the monthly figures to date is also shown. One such chart is prepared for each district and one for the total sales of the company.

If a business makes two or more different lines of products, to each of which quotas have been assigned, the way in which these quotas are being met should be watched in the same way.

The Gantt Progress Chart, Figure 7, presents the same comparisons in a less picturesque but much more compact form. A description of this chart appears beneath it. It is so easily drawn and so compact that the quotas and records of each salesman can be charted with but little trouble.

A series of such charts, covering all the sales activities, has great value. The sales manager can see at a glance that Albany, for example, is falling behind, and he will want to know why. The factory manager will notice that the demand for the superior-quality hosiery is growing faster than that for the medium grades, and this will affect future production schedules. The financial manager will study the relation between sales and collections (which are often plotted on the same chart), and he will investigate any discrepancies. The general manager, with the charts before him. in conference with the execu-

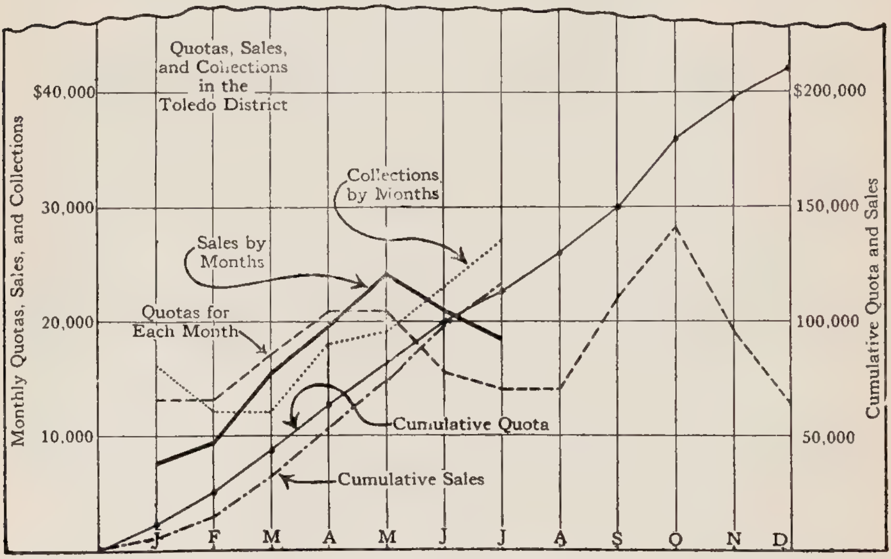
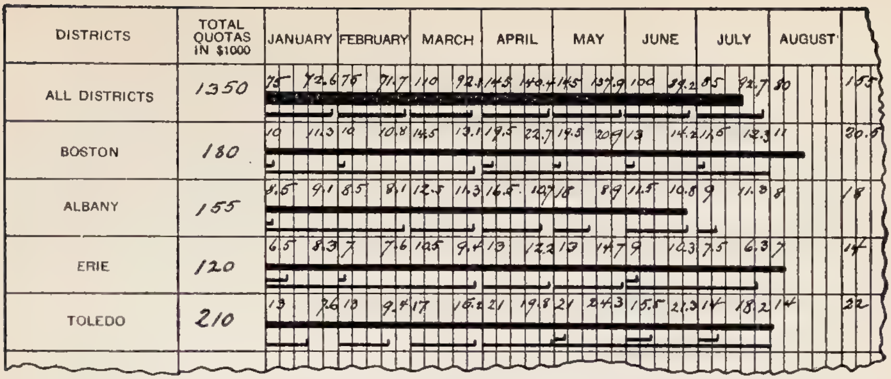


Figure 6. A control chart, showing the monthly quotas assigned to a certain district, the actual sales made during the first seven months of the year, and the collections during the same period. Notice that the cumulative curves—the curves which show the quotas and sales for each month added to the totals of all the preceding months—are drawn on a scale which is one-fifth that of the monthly curves. This is the usual practice when monthly data and totals for a year appear on the same chart.

In practice, it is customary to show also the figures from which the curves are charted. If the curves are drawn on a large scale, the figures may be written next the points that represent them. Otherwise, they are often shown in a table alongside of or above the curves.

From a study of this chart, the management will see that this district got away to a bad start, but that during May, June, and July, sales are so far ahead of the quotas as to more than make up for the setback. This is shown clearly by the curve of cumulative sales which, at the end of July, is above the cumulative quota. The collections curve shows the amount and degree of lag between sales and collections.

(The data charted here are the same as are charted for Toledo in Figure 7.)



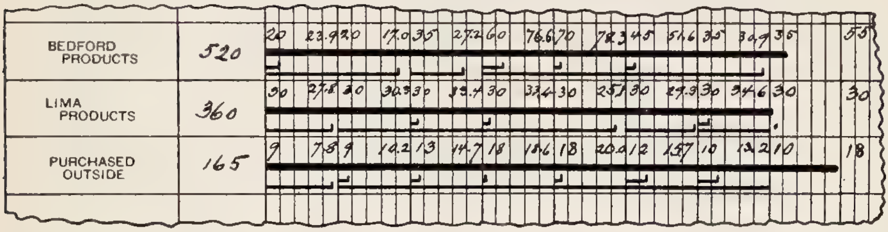


Figure 7. (Above) A Gantt progress chart comparing quotas and sales. This type of chart shows to what extent certain predetermined standards have been met. Such standards or quotas must be set, therefore, as a necessary first step before this chart can be used. The total quota for the company as a whole, for this year, and the quotas assigned each district are shown in the first column. These quotas are divided into monthly quotas, which are printed in the upper left-hand corners of the boxes, as shown. The actual sales are then entered in the corresponding upper right-hand corners. (In this case, all amounts as shown as multiples of $1,000. When there is room, the exact amounts are shown.)

The percentage of actual sales for the month to the quota for the month is then figured, and a light line drawn along the bottom of the box to show this per cent. The length of the box is considered 100 per cent. If the percentage of performance is over 100 per cent, a second light line is drawn above the first to represent the excess. A glance down the column of any month shows which offices have exceeded quota, which have just met it, and which have fallen behind.

The heavy line opposite each office shows the percentage of cumulative sales to cumulative quotas. We see on our chart that at the end of July the total sales for all districts are a little behind quota, and that this is not due to one bad month so much as to a failure to meet quota every month. Looking down the line separating July from August, we see that, of the districts shown, only Albany has failed to meet the cumulative quota thru July 31; however, the failure there is a bad one, due largely to poor sales during the big months of the season, April and May.

Figure 7a. (Below) A Gantt progress chart showing an analysis of this company's business by classes of products. The expected sales in each line are scheduled by months, and compared with actual sales. Notice that all the classes shown are being sold a little more freely than was anticipated.

tives who are responsible for seeing that the quotas are met, has a bird's-eye view of the progress of the business, its weak spots, its strong spots, its strong men, and its weaker men, and the degree to which performance is measuring up to the plans for the year.

Quotas Are Subject to Readjustment. Of course, if the quotas prove impossible to attain, they should be changed —and the sooner they are changed, the better. Unforeseeable factors are likely to arise. If the new factors are important, new quotas and new schedules based on them should be set.

> **In employing quotas and schedules of all kinds, necessary changes in them must not be arbitrarily ruled out.**

But with general statistics as accurate as they are today, with the trends which they represent so well understood, and with the principles of managerial control so well worked out, there is little excuse for inability to chart quotas and schedules which will guide the progress of a business on a course which will not be materially altered—unless changes are caused by developments that could not have been anticipated when the quotas were fixed.

* * * * * *

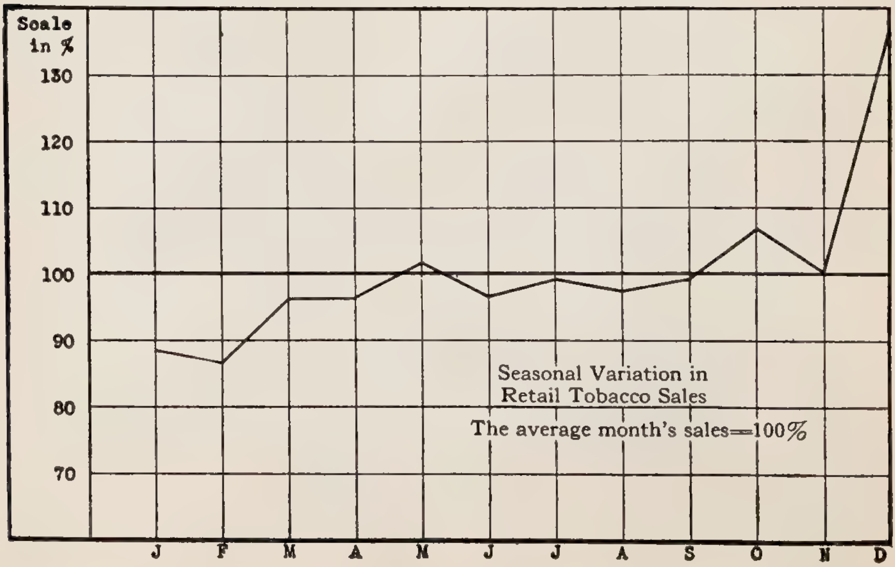
An uncut diamond coated with dirt reveals its value only to the expert. Statistical facts, just bare facts, are appreciated by few. Diamonds and statistics must be properly prepared and properly presented before their real values are evident. Executive Manual 77 tells us how statistics should be presented to bring out their full meaning.

CHECK-UP ON PRINCIPLES

Use the following check-up to get the principles of this manual firmly fixed in mind. This will help you to handle the problem which follows. This check-up is entirely for your own personal use, so you need not send it in to the University.

	Check	
	Yes	No
1. Do you see any good reasons why the statistical department of a business should not be as important as the accounting department?		
2. Several hundred thousand sources of statistical information contribute to the fund of data on which are based the curves of business progress of the *LaSalle Business Bulletin*—every railroad station agent in the country, for example, contributing information on which the Car Loadings curve is based. Fifty years ago, practically none of this information was available. Do you see any way in which even a small modern business can be conducted efficiently without using these very recently organized statistical aids?		
3. With the wide-spread and well-digested knowledge of business statistics that we find to-day, is it likely that in the future the business pendulum will swing widely—from booms to depressions?		
4. Have you made a careful study to find the external sources of statistical information which will be most helpful for your business?		
5. Have you given thought to the advantages, from the standpoint of statistical comparisons, which will result from a universal adoption of a thirteen-month calendar with each month consisting of twenty-eight days—four weeks?		
6. It is the practice of some large companies to bill all interhouse and interbranch shipments and credits "No Charge" when the amounts involved are less than $1.00; yet these same companies will go to great pains to correct an error of one ten-thousandth of a dollar in computing the cost of some small standard part. Do you recognize the principle back of this apparent inconsistency?		

	Check	
	Yes	No
7. Have you set yourself quotas for any of your activities—for example, the number of Executive Problems per month you schedule yourself to complete?		
8. A new automobile, which is in the same price group as the Dodge car, is about to be marketed. The output for which the factory is designed is one-twentieth that of the Dodge plants. Knowing the care with which Dodge sales quotas are worked out, the managers of the new organization propose to schedule sales quotas which are just one-twentieth of the Dodge quotas for each territory. Do you see three reasons why this plan is likely to go wrong?		
9. Sales in the tobacco department of a drug store were as follows: Jan., \$376; Feb., \$405; Mar., \$480; Apr., \$502; May, \$515; June, \$496; July, \$525; Aug., \$510; Sept., \$470; Oct., \$485; Nov., \$450; and Dec., \$520. The seasonal variation in sales in a chain of cigar stores is shown below. Does the drug-store manager seem to have reason to congratulate himself on the progress the tobacco department is making?		



Executive Problem 76

SALES QUOTAS FOR YOUR BUSINESS

Determining the Quotas that Should Be Assigned to Each Territory and for the Business as a Whole

UNDER THE LASALLE PROBLEM METHOD

* * *

"EVERY effort should have a specific goal for its object, otherwise it is partly aimless and lacks the stimulus of a definite target. It is the highest wisdom of sales administration to set definite quotas. It simplifies and objectifies everything, because it sets a specific task for everyone."

This statement comes out of the ripe experience of a sales manager to whom many another sales manager has gone for counsel and advice.

Prepared by the Research and Consultation Staff of LaSalle Extension University from an interesting problem which it has carefully investigated and analyzed.

Executive Problem 76

SALES QUOTAS FOR YOUR BUSINESS

Your business, or some business in which you are deeply interested, is the business which you are to study in working this problem. We ask you to work out sales quotas, either for the business as a whole or for some one of the lines sold, and either for the entire market, for some district, or for some particular territory.

After having determined on a quota basis for a year—or for six or three months, if this is the more practical quota period—you are to work out the percentage of the total quota which is to be assigned as the quota for each month. In doing this, you must, of course, take seasonal variations into account.

As suggested in the first paragraph, this problem will have greatest value for you, if you work it out for some business with which you are fairly well acquainted. If you can get exact figures regarding that business, good. If you can't, don't let that "stump" you; from your acquaintance with the business, estimate sales which you believe are reasonable; when you have a chance to get the exact figures later on, it will be interesting to you to see how close you have come.

BUSINESS MANAGEMENT

CONTROL THRU CHARTS

—Being Executive Manual 77, on Accounting and Statistical Control, in a Complete Plan of Training and Service for Executive Work

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CONTROL THRU CHARTS

Part I

MARSHALLING THE DATA

THE preceding manual has shown us the ways in which statistical facts are brought together, the precautions that must be observed to avoid incorrect conclusions, and the valuable means of control which management secures thru quotas and schedules based on accurate statistics. This means of control can be further extended and developed if the statistical facts are vitalized—given life, so that their meaning and importance stand out clear and unmistakable.

This process of giving life to statistical facts may take two general forms. In one, the facts are presented in numerical tabulations; in the other, they are shown in charts or graphs. The assembling of statistics for presentation naturally starts with numerical tabulations; for it is only thru the collection and properly arranged tabulation of numerical facts that charts and graphs may be constructed.

Statistical Tabulations—the Purposes Behind Them. The effectiveness of statistical control depends greatly upon the skill with which the numerical statistics of a business are classified and grouped. Yet, too often, tables of statistics seem but a jumble of figures. The compilers of these tables may have seen a meaning in them, but they lacked knowledge and judgment in selecting and presenting the significant facts so that others also could read their meaning. He who compiles statistics must have a clear conception of what the statistical presentation is to accomplish.

The *purpose* of the statistical record or report gives the key which answers every question of selection, of grouping, and of presentation of numerical facts. The comptroller must know just what figures he is after and *why* he wants them; the sales-promotion manager must know just how the information he seeks about prospective buyers will prove useful.

> **Keeping the purpose of the investigation constantly in mind saves a vast amount of needless work, and also tends to eliminate from tabulations any figures which may cloud the question that is up for analysis.**

A sales manager asked for special data which would enable him to tell why the selling costs in some branch offices were much lower than in others, despite the fact that the direct selling expense per dollar of sales was about the same for all the offices. Under these circumstances, the inclusion of several columns giving for each office the highest salary paid, the lowest salary, and the average salary; the direct selling cost per dollar of sales for the high-salaried man, for the low-salaried man, etc., would involve unnecessary work in preparation and would divert attention from the columns where there were real variations—perhaps in administrative overhead, perhaps in warehouse expense, perhaps in some other expense factor.

On the other hand, had there been a noticeable variation in direct selling costs, a detailed analysis by salesmen would have been invaluable, because it would have complied with the purpose of the report.

> **The purpose for which statistics are being compiled will determine which figures must be included in a tabulation and which can be omitted; the simpler the tabulation, the more readily will its meaning be grasped.**

Arranging Tabulations Logically. The present and probable future uses of the statistical data collected will suggest how the tabulations should be arranged. In compiling the facts relating to a company's payables, the facts could be arranged in chronological order of maturity dates, or alphabetically by creditors' names, or in groups according to the nature of the obligations; or a combination of two or more such methods might be the best for our purpose.

Statistical records regarding standard parts used in production are sometimes arranged according to arbitrary part-numbers, sometimes according to the material of which they are made, sometimes according to the products for which they are designed. There are also other logical arrangements, and good reasons can be advanced for every one; the choice should fall on that arrangement which best serves the present and probable future purposes.

Tabulations of figures should be arranged in some logical order which will facilitate the finding of any desired numerical facts, the obtaining of subtotals for naturally related groups, and the comparison of items and subtotals whose relative values it may be desirable to study.

To study the work of a company's salesmen, for example, the tabulations may be subdivided according to district offices, and the district offices may be arranged according to geographical location, thus bringing all Eastern, Central, Western, and Pacific offices together in separate groups for comparisons within the groups and between them.

All the salesmen in one district could be grouped into useful classifications, such as the aces who made or exceeded their quotas; those who failed to make their quotas; and the juniors, to whom no annual quotas had yet been assigned. In each group, the high man might be listed first, with the others following in order. Thus arranged, the records of the high men in all the offices could easily be compared; the proportion of men who made the quota could be determined readily; and the totals for various groups could be assembled and analyzed. Such an arrangement of tabulations involves little extra work of preparation, and is much more useful than alphabetical lists of the salesmen and offices.

Arranging the Order of Columns. If the tabulations are fairly extensive, the order of the columns is as important as the order of items in each column; and this order will also be decided largely by considering the purpose for which the table is to be prepared. There are, moreover, certain rules which will help us. One of these rules was brought out in Executive Manual 27, where it was stated that the heading of an advertisement—the most prominent line—should tersely tell the message of an advertisement. So—

> **In tabulating figures, we should throw our more important figures into the foreground of attention.**

We can often do this by showing these figures in the first column, or in the first few columns, putting the supporting or detailed figures in the following columns.

Grand totals, for example, are often more important and significant than the detailed figures. Grand totals, according to a strictly logical order, would appear in the right-hand column and along the bottom of the table—the least conspicuous positions. Many statisticians, however, list the grand totals along the top line of figures and in the first column. Often these totals, and other important data, are printed in boldface type, or in a wide space or column where the surrounding white space accentuates their importance. In short, the statistician can profit by his study of advertising in the presentation of his numerical tabulations.

Naturally, the figures in these prominent positions are studied first, and detailed figures are studied in the light of the story the totals tell.

> **The busy executive is chiefly interested in totals as a means of control; tabulations, then, should be so arranged as to present the totals in bold relief.**

A story which illustrates this principle well is told about the head of one of our largest department stores. This man was accustomed to having a summary of the previous day's business on his desk each morning at ten

	ALL DEPARTMENTS							MACHINE DEPARTMENT			
	This Month (1)	Standard Month (2)	Variation (3)	Year to Date Amount (4)	Year to Date Ratio (5)	Same Period Last Year Amount (6)	Same Period Last Year Ratio (7)	This Month (8)	Last Month (9)	Standard Month (10)	Variation from Standard (11)
TOTAL MANUFACTURING COST	$32,207.41			$175,958	1.00	$172,190	1.00	$14,711 03	$15,032.14		
Direct material	$ 7,629.69			$ 35,927	.210	$ 28,621	.166	$ 4,289.23	$ 4,762.77		
Direct labor hours	25,830	27,000		151,644		148,726		9,650	9,800	9,880	
Direct labor cost	$18,881.73			$112,371	.634	$116,301	.676	$ 8,163.79	$ 8,123.87		
D. L. cost per hour	.731	.750	*.019*	.741		.782		.845	.829	.850	*.005*
Departmental indirect labor	$ 1,722.90	$1,656.00	$66.90	$ 8,321		$ 9,132		$ 643.00	$ 643.00	$ 633.00	$ 10.00
Idle time	198.30	140.00	58.30	692		702		108.10	78.05	75.10	33.00
Defective work	810.12	680.00	130.12	3,619		3,278		298.50	212.70	282.80	15.70
Supplies	469.18	450.00	19.18	2,218		2,322		180.60	175.80	171.80	8.80
Power	370.60	348.00	22.60	1,956		1,697		192.75	178.45	190.60	2.15
Maintenance and repairs	187.67	175.00	12.67	888		926		60.20	76.85	82.85	*22.65*
TOTAL CONTROLLABLE EXPENSE	$3,758.77	$3,449.00	$309.77	$17,694	.100	$18,057	.105	$1,483.15	$1,347.98	$1,436.15	$47.00
CONTROLLABLE EXPENSE PER D. L. HR.	.145	.128	.017	.117		.121		.154	.138	.145	.009
General indirect labor	$ 724.42	$ 712.50	$ 11.92	$ 3,636		$ 3,557		$ 289.76	$ 298.70	$ 285.00	$ 4.76
General departments' expense	598.55	520.25	78.30	3,111		2,642		239.40	248.70	203.10	31.30
Other apportioned charges	614.25	610.00	4.25	3,219		3,011		245.70	250.22	244.05	1.65
TOTAL APPORTIONED CHARGES	$1,937.22	$1,842.75	$94.47	$ 9,966	.056	$9.210	.053	$774.86	$797.62	$737.15	$37.71
APPORTIONED CHARGES PER D. L. HR.	.075	.068	.007	.066		.062		.080	.081	.075	.005

Figures in italics show decreases.

Figure 1. An Excellently Arranged Statistical Table. You will notice that the top line shows the totals in which the executive is most interested; below each total are the supporting details. Notice also that the totals for "All Departments" are analyzed first. Then come groups of departmental figures (but one group is shown here). Notice also the columns for the "Standard Month" on which the budgets have been based, and for comparative figures and ratios.

o'clock. One day a newly appointed statistician was somewhat delayed in completing the report, so he delivered it personally. The chief took it without looking up, glanced at it, and tossed it into the waste basket.

The statistician was much chagrined at this treatment of the report which had cost him hours of work, and, without thinking, blurted out, "Don't you like my reports, Mr. H——?"

"Like them? Yes, I do," answered H——. Then the significance of the question came to him and he added, "Let me tell you, young man; a report which tells me what I want to know so quickly is a report you can be proud of. I saw that all departments except the basement show a normal condition, and that's just what I want to know."

Arranging Columns for Easy Comparison. It is very largely thru the comparisons which they make possible that statistical tabulations are important as a means of control. The manager compares one man's work with another's, the cost figures for one month with those for the month before, this year's interest charges with last year's, etc.

Plans for tabulating statistical facts should include a provision for these comparisons. Often comparison is made easier by showing last year's or last month's sales, or this year's quota-to-date, or whatever comparison should be made, in an adjoining column or line. The table shown in Figure 1 is an example of well-arranged columns. Ready comparison may be further facilitated by showing data with which comparisons are to be made, in a different colored ink.

Percentage Comparisons Assist in Control. The significance and relationship of figures often become clearer when the relationships are shown as percentages. We saw this fact illustrated in Executive Manual 44, where the significance of the balance-sheet items was brought

ANALYSIS OF SALES, COSTS, AND PROFITS FOR 1924 AND 1925
FOR THE ACORN MANUFACTURING COMPANY
(See Appendix to Executive Manual 37)

	Amounts		Per cent of Sales Price	
	1924	1925	1924	1925
Manufacturing Cost				
Paid for Material	$285,181.72	$411,762.23	37.1	39.1
Material Burden	10,800.00	12,494.32	1.4	1.2
Total Material Cost	$295,981.72	$424,256.55	38.5	40.3
Direct Labor	160,574.00	188,334.19	20.8	18.0
Indirect Labor	65,145.33	72,525.30	8.6	6.9
Supplies	18,875.00	21,782.77	2.4	2.1
Other Mfg. Expense	22,971.93	21,009.26	3.0	2.0
Total Mfg. Cost	$563,547.98	$727,908.07	73.3	69.3
Selling Expense				
Direct Selling Expense	$ 66,511.39	$ 85,986.43	8.6	8.2
Indirect Selling Expense	25,486.70	28,633.72	3.3	2.7
Advertising	21,473.89	40,871.32	2.8	3.9
Total Selling Expense	($113,471.98)	($155,491.47)	(14.7)	(14.8)
Selling and Mfg. Cost	$677,019.96	$883,399.54	88.0	84.1
Administrative Expense				
Office and financial expenses, taxes, etc	75,084.31	69,676.86	9.8	6.6
Total Cost	$752,104.27	$953,076.40	97.8	90.7
Profit	16,751.22	98,239.58	2.2	9.3
Sales (See note)	$768,856.49	$1,051,315.98	100.0	100.0

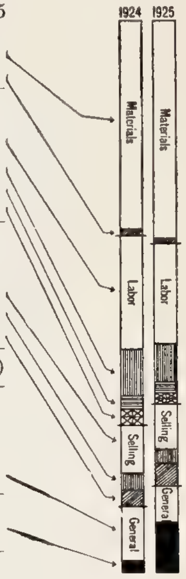


Figure 2. A tabular presentation of statistics and two 100 per cent bar charts. This figure shows three steps in the development of the presentation of statistics for control purposes. (1) If, with a sheet of paper, you cover the per cent columns and the two bar charts, you see a simple tabulation of the data, well arranged for comparisons and study. The figures are accurate, but their real meaning is rather hidden. (2) Move your sheet to the right so as to uncover the per cent columns. These columns make helpful comparisons much easier. Nevertheless it requires considerable study before we can put our finger on the factors which are responsible for making 1925 profits almost six times greater than 1924. (3) Look next at the two bar charts. It is evident at once that the decrease in Office, Administrative, and Financial Expense has been the greatest single factor in increasing profits, with the decreased labor cost a close second.

Clearly, a series of such bar charts for successive years will give a complete picture of the comparative costs and profits of the company—a picture whose meaning is far more easily grasped than that of the annual production and sales figures for all those years.

Note: The Selling Expense and Sales figures are based on the actual figures for these items, but include a small prorata addition required by the assumption that as much goods were sold during the year as were manufactured.

out by columns showing, in the form of percentages, the ratios between the items and totals.

So, too, an analysis of marketing costs and profits is often facilitated by columns which show, as percentages, all the elements that enter into the total sales. This is illustrated in Figure 2. In the same way, the annual cost of production can be studied by figuring what per cent each cost element is of the total cost. The business man, when planning statistical tabulations, recognizes these values and provides appropriate columns for these percentage figures.

The Outstanding Principles of Tabulation. Briefly, the more important principles to be observed in tabulating statistical facts are:

1. Statistical facts are presented for a definite purpose, and should be tabulated in a logical order, with this purpose uppermost.
2. The relative importance of the different elements of the report should be appreciated, so that the important facts will not be buried, but will stand out with all due emphasis.
3. The use of statistics as a means of control should be facilitated by the presentation of figures with which useful comparisons can be made, and by the showing of ratios and percentages.

While numerical tabulations of statistical facts give management an important means of control over the various operations of the business, their usefulness can be greatly increased by presenting them in chart form. As a matter of fact, numerical tabulations are often compiled, not for presentation as such, but for conversion into highly informative charts or graphs.

Absolute figures, while important for control purposes, are often not so useful as ratios and comparisons that may be drawn from them. These ratios and comparisons enable management to watch trends closely. Trends are best depicted on charts and graphs; therefore, in Part II we shall take up the fundamentals of charting.

CONTROL THRU CHARTS

Part II

Vitalizing Statistics

MANAGEMENT wants statistics presented in chart form because it can usually get a better idea of trends and relationships when these are shown in charts. Charts are pictorial, while figures are abstract. Lines plotted on a chart are more readily compared than are the numerical values which they represent.

> **The mind can readily grasp, study, and compare the relationship of MANY facts when these are presented in the form of a chart.**

The fact that charts permit simultaneous comparisons between many statistical items is one reason for the widespread and increasing use of charts; for these comparisons give a clear picture of trends and relationships which could be detected only with great difficulty, if at all, so long as these statistics were in the form of numerical tabulations. In brief, three outstanding advantages in using charts are that—

1. They give us a more vivid conception of relationships than do the corresponding numerical tabulations.
2. They provide a means for making accurate, simultaneous comparisons which call attention to variations in the statistics that are under observation.
3. They clearly visualize trends of change.

Charting for Accurate Comparisons. A chart may misrepresent facts—even tho each dimension on it is exact, fair, and truthful.

Great care must be exercised to avoid an incorrect picture of what the chart is intended to convey. If the chart exaggerates the trends or relationships it portrays, it may lead to erroneous conclusions.

The manager of a woolen mill was proud of the fact that, notwithstanding a period of depression, the company's sales for the year were 10 per cent above the average of the past three years. He wanted to make a pictorial exhibit of this fine achievement for the directors to see, so he asked a draftsman to prepare a chart of monthly sales compared with the average sales for the past three years. This draftsman, however, had had no training in statistical presentation, and the chart he made is the one shown in Figure 3.

	Sales	
	Three Year Average	For 1924
Jan.	$250	$200
Feb.	200	180
Mar.	200	150
Apr.	200	150
May	300	150
June	500	400
July	600	750
Aug.	600	900
Sep.	700	1000
Oct.	800	1100
Nov.	300	250
Dec.	200	150
	$4850	$5380

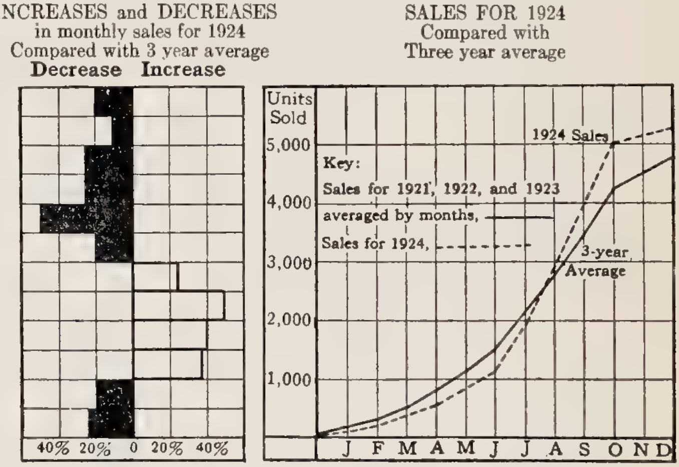


Figure 3 shows how incorrect may be the impressions conveyed by a chart which is drawn accurately so far as its dimensions go, but on incorrect charting principles. The text explains these errors. **Figure 4** shows one of several ways in which the same data can be charted to give an accurate picture for the year's results.

The general idea of Figure 3 is excellent for charting certain types of data—for example, monthly or annual variations in price or quantity from a certain standard price or quantity which is represented as the central or "base" line. This form of chart is used in the *Survey of Current Business* of the U. S. Department of Commerce to show the monthly variations in price of a long list of commodities.

This chart, which the manager had not yet seen, was hanging on the wall in the room where the directors were gathering. When the manager entered the room, one director sarcastically greeted him with the remark, "A fine showing you're making! That chart there tells a sad story. Why all the optimistic letters I've been receiving?"

And yet this chart was accurate; it was accurately drawn. The draftsman had, however, made two mistakes in his method of charting. For one thing, he had drawn all below-average bars in solid black, thus giving them greater emphasis than the above-average bars. Then, too, he had paid no attention to the effect of variations in seasonal demand, so that the percentage losses of an off-season month, such as May, were as impressive as the substantial gains recorded in the large-volume months. Figure 4 shows an excellent method of presenting these same statistics in a chart form that pictures the variations in their true relationships.

Six Essentials in Charting. The divers methods of charting which are in use, and the real need for using, in each case, the method that will assure correct interpretation of the statistics charted, have led the American Society of Mechanical Engineers to give considerable study to the matter. Six of the more important essentials are:

1. Charts should be laid out on as natural a plan as possible.

They should read from left to right. Charts where one variable is time should always show the earliest period on the left or at the top. Lines or distances indicating magnitude should always extend upward or toward the right—except that negative numbers or losses are often best shown by extensions in the opposite direction from the zero line. (Figure 3 is correctly drawn in this respect.)

2. The zero line (or, in some charts, the base line) should always be clearly indicated and emphasized and should be included in the chart.

Figure 5 shows the importance of this.

3. A method of presentation must be selected which is free from optical illusions.

The draftsman for the woolen mill company, in the case just cited, broke this rule, for he used areas injudiciously. Figures 6 and 7 illustrate well why areas are not, as a rule, satisfactory in charting. The mind finds it difficult to compare such areas accurately. On the other hand, the element of area is used very effectively in the chart showing the monthly budget of costs and expenses in Executive Manual 40. The wider blocks assigned to the five-week months aid in painting a true picture of the budget shown there.

The idea of area is also used effectively when the charting is on a map. If a magazine publisher, for example, puts on a map of the United States, within the outlines of each county, a bright red dot for every hundred magazines going into that county, the relative geographical distribution of the magazine can be seen at a glance. If he uses a map whose state boundary lines have been lengthened and shrunken so that the areas of the states are shown proportional to the population in each district (such maps can be procured), a more truthful picture of the magazine's distribution is obtained than when an ordinary map is used.

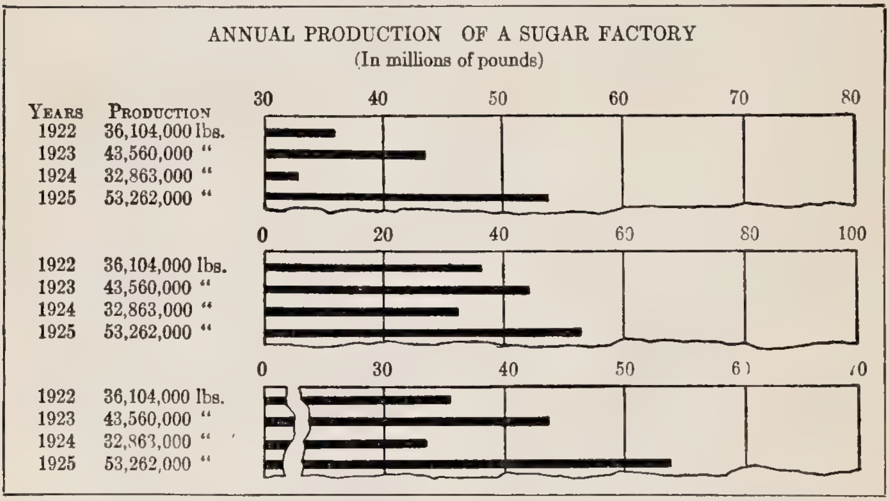
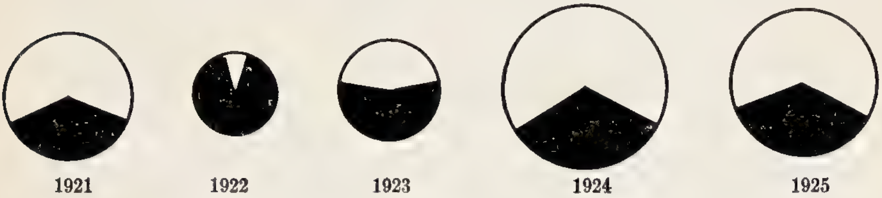


Figure 5. Good and bad charting of the same data—the annual production of a sugar factory. Since the production is unlikely ever to be less than 30,000,000 pounds and may be more than twice that amount, it would seem logical to use the 30,000,000 line as the base line, as in the top chart. But this chart gives entirely incorrect impressions. 1924 production seems negligible compared with 1925.

Correct charting requires that all distances be measured from 0 as a base, even if this requires that the chart be drawn on a smaller scale, as in the middle chart. The method shown in the bottom chart is fairly good. The break in the lines warns the observer that he must notice what the real values are before he draws any conclusions; and the annual variations are drawn on the same large scale as in the top chart. For general use, however, the middle chart is best.

Ordinary line curves, such as those shown in Figures 8, 12, and 14 are liable under certain conditions to give erroneous impressions. The observer is likely to gain an impression of magnitude from the area below the lines that connect the points, rather than (in the only correct way) from the distance of the points above the base line.

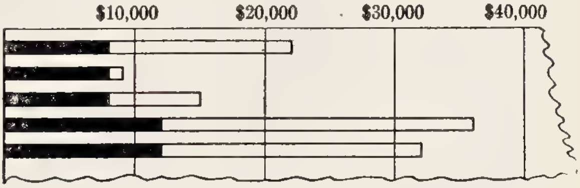
This intrusion of area into our judgment as to the significance of a point on the curve makes little difference except when one point stands out by itself far above or below those that precede and follow it. Such an exceptional point is likely to be misjudged since the slender, sharply-pointed angle leading up to it contains little area and gives an impression of lightness. For these reasons bar charts are often preferred in picturing data which have sharp fluctuations of considerable magnitude.



YEARLY PROFITS AND THEIR DISTRIBUTION

The areas of these circles indicate the relative profits made in the above years. The black sector shows the amount that was paid out in dividends; the white sector, the amount that was added to surplus.

	Profits ◧	Dividends Paid ■	Addition to Surplus □
1921	$22,036	$ 8,000	$14,036
1922	9,123	8,000	1,123
1923	15,003	8,000	7,003
1924	36,251	12,000	24,231
1925	32,190	12,000	20,190



YEARLY PROFITS AND THEIR DISTRIBUTION

Figures 6 and 7. Additional examples of incorrect and correct charting. The upper chart (Figure 6) is an attempt to exhibit the amount and disposition of a company's profits by circles whose areas are proportional to the amounts. Who would judge from looking at these circles that 1924 profits are four times larger than 1922 profits, or that the same dividend had been paid during 1921, 1922, and 1923? An excellent way of charting the same data is shown in Figure 7. Notice that no explanation is necessary here, since the headings of the columns make the chart self-explanatory. Circle charts ("pie" charts, they are often called) have their uses. The best use is in showing how a dollar of sales or cost is divided. Executive Problem 34 showed an example.

4. The title of a chart must be so complete and so exact that it can be understood by one who knows

nothing more about the chart than the title tells. And every chart should be dated.

The value of the units used in charting should also be very completely defined on the chart itself. Furthermore, there should be not the slightest doubt left in the reader's mind regarding the significance of the vertical or horizontal divisions. Often dots representing annual sales, let us say, are shown on the vertical lines which separate years. There is less likelihood of misinterpretation if these dots are placed halfway between the vertical lines, or if the date or period is represented by a vertical line and is indicated immediately beneath it—as is done in the *LaSalle Business Bulletin* charts.

The lines connecting the points (these lines are called "curves"—no matter how jagged they may be) should also be very carefully titled. While the complete description of each curve will appear in the legend of the chart, it is best, wherever possible, to show descriptive titles just over or under the curves themselves. This saves the reader the trouble of carrying a "key" in mind all the time.

5. It is in many cases very desirable to show on the chart itself, or immediately adjacent to it, the numerical tabulations which the chart portrays, thus providing exact figures for any computation that anyone may desire to make.

6. Simplicity is essential; don't try to show everything that is showable on one chart.

Even with carefully keyed, distinctive curves, the picture may be confusing when more than four or five curves appear on one chart. One set of statistics can often be charted best as a *series* of charts, the same values, as nearly as possible, being assigned to the horizontal and vertical spaces on each chart, so that the charts can be readily compared with each other. For example, if the same plan of charting is used year after year, any chart can be put alongside any other (if semi-transparent paper is used, one can be put over the other) and direct comparisons can be made.

If curves are not likely to cross and recross each other, more data can be plotted on one chart. So, too, if there is a well-defined relationship between certain data, two or more curves or bars can sometimes be joined into one. This is illustrated in Figure 8, where the short bars represent the range in prices during the month. The top of each bar shows the high for the month, the bottom the low, and the central dot the average price.

You will be well repaid by examining critically in the light of these six essentials, the many kinds of charts that are being published to-day. You will thus be able to absorb much of real value about charting methods. Many ingenious methods of charting are now used; but do not be misled by their ingenuity. It is well to remember that—

> **A chart should help the reader to interpret accurately and quickly the message contained in the statistical facts portrayed by the chart.**

The chart which does this accurately and surely is a good chart, no matter how simple or how crude its workmanship.

Many valuable and suggestive chart-forms, and many accurate statistical tabulations covering almost every important industry, are to be found in the *Survey of Current Business,* a monthly publication of the U. S. Department of Commerce. Its cost is $1.50 a year, or 10 cents for one copy (except the semiannual numbers, which are 25 cents each). If you are not already acquainted with the vast fund of information which the Government sends out in this form, it will pay you to get a copy of the *Survey* and study it.

Having covered the essentials of a good chart, let us next take up some special charting methods by which statistical facts may be so presented as to give management an invaluable means of control.

CHARTS ADAPTED TO CONTROL PURPOSES

Charts have, as we have seen, the great value of presenting a large number of statistics in such form that direct comparisons can easily be made. But many relations between the various sets of statistics are not at once apparent. It is necessary that these relations be brought out by certain special charting methods. For control purposes, let us first consider the methods of charting percentage comparisons and ratio relationships, and next the methods of determining and charting trends of change.

Percentage and Ratio Relationships Facilitate Control. In the table shown in Figure 2 in Part I of this manual, the selling expense for 1925 is $42,020.38 greater than in 1924—an increase that might cause some alarm, were it considered by itself. The percentage columns show, however, that selling expense for 1925 bore practically the same relation to sales volume as during 1924.

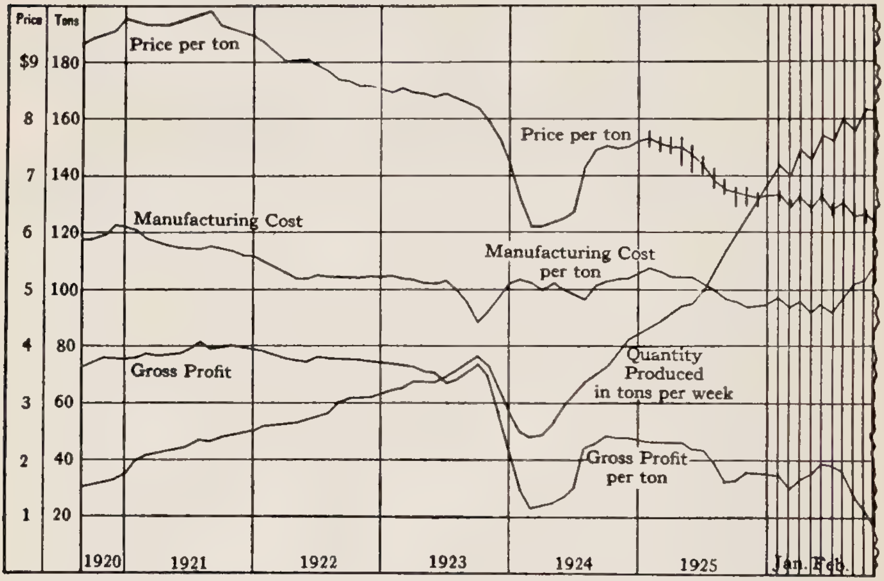


Figure 8. A gross-profit control chart. This chart shows how the gross profit made on a highly competitive staple product may be controlled by study of a simple chart. The top line shows the average sales price by months, except for the current year, when averages are shown for each week. The short vertical bars on the price line for 1925 and 1926 show the range between the highest and lowest prices for the preceding period.

By deducting the manufacturing cost per ton (the second line) from the average price per ton, we get the gross profit per ton (the third line). Notice how the manufacturing cost has gradually decreased as the quantity produced (the fourth line) increased. Notice also the striking effect on all the curves of a strike in an allied industry during 1923 and 1924. Notice also the recent marked downward tendency in the profits line, caused very largely by an increase in manufacturing cost notwithstanding (possibly, because of) a rapid increase in quantity produced. Here's something for the management to look into.

When statistical compilations are employed for control purposes it is customary to calculate such ratios as *Direct-Labor Cost per Ton, Current Assets to Current Liabilities* (the current ratio explained in Executive Manual 44), *Actual Sales to Sales Quota, Employe Terminations to Average Number of Employes* (labor turnover), and *Total Units Produced to Total Employes.*

Ratios, both in numerical and in chart form, can give management comparisons and relationships that serve the purposes of control better than the actual statistics from which the ratios are drawn.

Management studies the statistics of its business to find these ratios and relate them to the activities which influence them. In a company manufacturing a diverse line of products, the management required a chart similar to Figure 8, for every one of its thirty products. These charts were made each Tuesday from the statistics for the preceding week. These statistics, while not as accurate as the figures that the cost department compiled on a monthly basis, were good enough to serve as a basis for curves which gave an immediate indication of any tendencies that would affect profits. As long as the profit line was level or was climbing upward, the chart was given little attention; but any definite downward slope in the profit ratio held the attention of all the responsible executives until the reason for the tendency was found.

The Gantt Progress Chart. Examples of the Gantt chart have been shown earlier in this training service. Executive Report 37 shows how this form of chart is used to control the progress of orders thru a shop; Figure 7 in the preceding manual shows how it may be used to compare actual sales with established quotas. You will notice that these comparisons are made by horizontal bars whose length represents the *percentage of progress* which has been made toward completing the job or meeting the quota.

This very useful form of chart is adaptable to every purpose where *progress* in reaching certain predetermined goals is to be measured. It can be drawn by anyone, with no more equipment than a pencil and ruler; it is so compact that the progress of many items can be shown on one chart (comparisons are thus facilitated); and it indicates, at a glance, on which items progress is below expectations. For controlling operations and sales, this form of chart—which one authority calls "the greatest contribution to chart-making from a single source"—is probably more useful than any other. Its uses are fully described in a book, *The Gantt Charts*, by Wallace Clark.

The Charting of Index Numbers. Index numbers are a somewhat ingenious method of facilitating comparisons of numerical data, and the charting of index numbers is a valuable method of facilitating control thru percentage and ratio relationships.

Index numbers are merely percentages—percentages calculated on some arbitrary value or quantity known as a base figure. This base figure serves as a common denominator, by which a series of absolute values is translated into relative values for the purpose of ready comparison.

A simple illustration will make this clear. Suppose we want to make a comparison of our selling prices over a period of years. We can do this by plotting on a chart the absolute values—the actual prices for the several years. We can also do it by plotting the relative values —the prices for the several years expressed as percentages of the average price for some one year.

Let us say that the 1913 price was $3.60 and that the 1924 price was $5.76. These are absolute values. Now if we take the 1913 price as a base and call it 100 per cent, we can express the 1925 price as a percentage of $3.60 by dividing $3.60, the common denominator, into $5.76. The result of this calculation is 1.6; that is to say, the 1925 price ($5.76) is 160 per cent of the 1913 price ($3.60). The *relative* values are therefore 100 for 1913, and 160 for 1925. These relative values (100 and 160) are called index numbers (or relative numbers), and are written, for convenience, without the decimal point or per cent sign.

If the prices for other years are then converted into index numbers by the same process, we may plot a curve of these index numbers that will show the trend of prices in index numbers, or percentages of the base price—the base price in this case being the price for the year 1913. This curve, representing relative numbers instead of absolute values, can be readily compared with other curves similarly constructed as percentages of the same base, even tho the absolute values are quite dissimilar and not otherwise easily compared.

The Usefulness of Index Numbers. A baking company finds a valuable means of administrative control in studying the prices it receives per loaf of bread in comparison with the prices it pays per barrel for flour, and the prices the miller pays per bushel for wheat; for, of course, the present price of wheat has a decided influence on future prices and profits on bread.

But the relationship here is complex; the units of measurement are different. If we were to plot wheat prices, flour prices, and bread prices on the same scale, the fluctuations in the bread-price curve would appear so small as to be almost unnoticeable; or the curves would be too far removed to make comparison feasible. These difficulties are obviated by the use of index numbers. Instead of plotting three curves representing the absolute values of the three commodities, the company selects a base year, calculates the relative values (index numbers) as explained above, and plots index-number curves. Thru this chart it can readily compare the relative fluctuations of prices for the three or more different products.

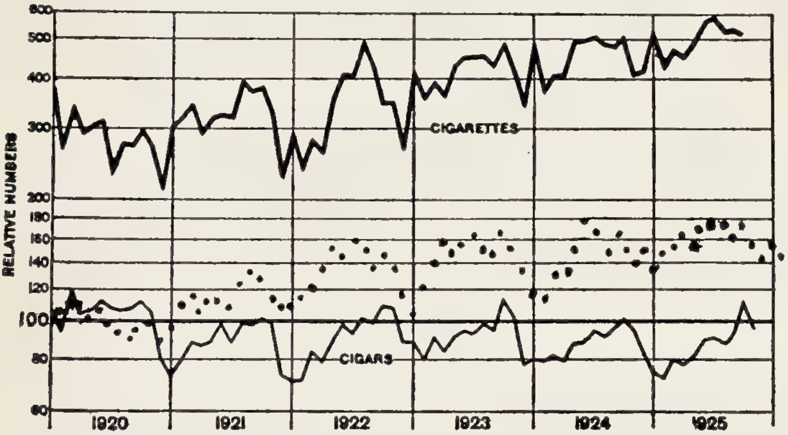
The average price for *any* period may be selected as the base—the common denominator—for index numbers. Practically, however, the period chosen should be one during which conditions were normal and satisfactory data were available. The year 1913 is very generally adopted as a base-year for price indexes, and that fact itself is a good reason why the management of a business should adopt it, since so many of the published price indexes are based on 1913 prices. Obviously, if in figuring relative numbers we use, as our base, the prices of our products for the same period as that used by the Government and by other statisticians in general, we can plot our own index numbers and theirs and make direct comparisons between the curves.

The calculating and plotting of index numbers is, of course, not limited to prices. Figure 9 illustrates this. Sales volume, factory output, interest rates, and many other valuable statistics can be reduced to index numbers for more ready comparison.

Various Uses of Index Numbers. From the foregoing explanation and illustrations you can see the possibilities in the use of index numbers. Index numbers, such as those described above, may be made up of the prices of a group of items, so as to give a resulting index that pictures price movements of a combination of commodities, such as of various building materials; or index numbers may be applied to the output for a whole industry, or to employment conditions over the whole country.

Some index numbers are quite complicated. One is based on the prices of more than four hundred commodities, with each commodity weighted so that it affects the resulting index number in proportion to its volume in trade. (This index number indicates the general price level.) But management is interested, not in the scientific details of the preparation of these complicated indexes, but in their usefulness. These published index numbers serve as indicators of trade and price movements in general, with which movements the activities and results of any one business can be compared, variations noted, and the causes of variations then determined.

There is another use of index numbers with which an executive should be acquainted. This is illustrated by the experience of the Standard Mercantile Co. This company had three divisions: a large retail store, a wholesale business, and a well-developed catalog trade with out-of-town customers. The net operating profit was quite uniform in each department from period to period, but there was a wide difference in profits between departments.



Relative Consumption of Cigarettes and Cigars

[1913 monthly average=100. November, 1925, is latest month plotted]

Figure 9. Relative numbers used to show trends. The chart shown is taken from the January, 1926, issue of the *Survey of Current Business,* and shows the growth in the use of cigarettes and also the falling off in the use of cigars. On this chart a manufacturer of cigarette holders has charted relative numbers which show how each month's sales compare with the average monthly sales for 1920. Notice that this series of penciled dots makes a curve whose trend it is very easy to follow. This trend is sloping upward more gradually than the curve just above it, which shows cigarette sales. The value of this fact from a control standpoint is self-evident. This chart is drawn with ratio ruling—which will be explained on the following pages.

The general manager used, for day-to-day control purposes, an index showing variations in profits. This was entirely independent of the monthly report that was completed by the accounting department ten days after the end of each month. The base figure used in calculating this index was the average weekly sales of the preceding year, divided according to the three divisions of the business. An index number was worked out each week to show how that week's sales compared with the average of the past year. These divisional index numbers were then combined as follows.

Suppose the divisions of the business showed normal *net-profits-to-sales* ratios of .07, .05, and .03, respectively. The index number of the first department would be multiplied by 7, the second by 5, and the third by 3. The sum of the products would then be divided by 15, which is the sum of the multipliers, and this gave a new percentage number which was the index that represented the probable profits for the week.

Index Curves as a Means of Control. Effective control of large and complex industries in particular is facilitated by the use of index numbers worked out and charted.

> **The elements that have an effect on the profits of a business can be assembled and combined into an index curve or a series of index curves whose variations give the general management a bird's-eye view of the health and progress of the entire enterprise.**

One important factor in the DuPont Corporation's outstanding success is found in its chart room, in which room the executive committee meets each month. Here are literally hundreds of charts covering every department and every branch of this company's activities. These charts show amounts of sales, rates of turnover, margins of profit, and so on for each branch and for each department; they also show summarizing indexes for the major divisions of the business and for the business as a whole. Any deviation from the normal or expected results is immediately revealed on the index charts. The management has, thru the indexes, a constant check on the operations of every department of the business.

The U. S. Gypsum Company makes a wide range of products, the more important of which are: cement, which is sold by the barrel; stucco, which is sold by the ton; wall board, which is sold by the square foot; and tile, which is sold by the linear foot. The executives of this company observe and control the total volume of goods produced, the current prices, the current costs of production, and the monthly variations in gross profit—not by scanning pages packed solid with statistical tabulations, but by watching the variations of four index numbers which express in simple, easily comparable form, summaries of all the vital statistics of the business.

The Weighted Average Corrects Misconceptions. General index numbers for the business as a whole may be derived from combinations of simple index numbers or from combinations of various statistics from which the simple indexes are made. This combining of several index numbers or of separate statistics calls for the use of a statistical device known as the weighted average. It is thru this device that the disproportionate elements entering into the combination index number are made to exercise their true influence over the resulting average. Suppose a company had three branches whose average sales and turnover of receivables were as follows:

Branch	*Sales*	*Receivables Outstanding*
A	$80,000	25 days
B	$30,000	23 days
C	$15,000	63 days

To say that the average time that receivables are outstanding is the average of 25, 23, and 63 (or 37 days) is clearly wrong, for only a small amount is outstanding over 25 days. Therefore, we should multiply Branch A's receivables turnover by Branch A's sales, B's turnover by B's sales, and C's turnover by C's sales; then divide the sum of these products by the total sales. The answer (29 days) is a weighted average and correctly states the average receivables turnover for the business.

Were weighted averages more frequently used where simple averages are being used to-day, there would be a decided gain in the accuracy of statistics and charts.

Charting on Ratio Paper. There has come into general use within the last few years a method of charting statistical data on special charting paper, the ruling of which is so proportioned that the *growth* relationship—the relationship between the *rates* of change in the factors compared—is made much clearer than when the same statistics are charted on ordinary charting paper.

By charting on ratio paper (also called logarithmic or log paper) we can see exactly how much faster or slower one thing is growing than another, and this by a simple inspection of the *slopes* of the curves. We can also study these relationships by working out ratios, percentages, and index numbers; however, we are required to make no extra computations in plotting on ratio paper.

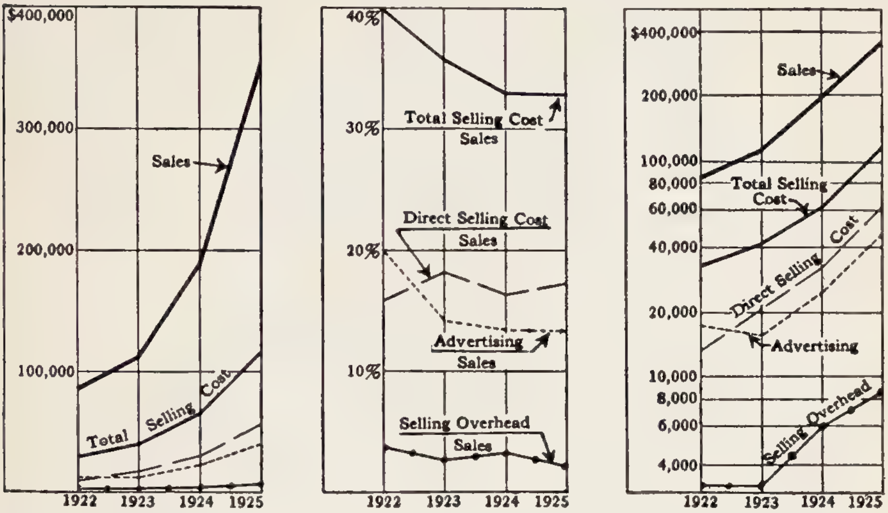
The use of ratio paper also has another important advantage: reference to the chart gives us the actual figures for the items shown by the curves. These figures—the absolute values—are not shown, of course, on ratio curves and index curves.

It is not necessary to go into the somewhat complicated theory on which the ruling of ratio paper is based. In using it we need only to know that—

> **When the slopes of two curves plotted on ratio paper are such that they tend to come together, the ratio between the quantities they represent is becoming smaller; when the curves are running parallel, the ratio is remaining unchanged; and when the curves tend to diverge, the ratio is increasing.**

No attention is to be paid to the vertical distances between curves; their slopes alone should be heeded, for they show the comparative *rate* of change—not the actual changes—in the quantities plotted.

Charting Methods Compared. Let us study the relations between the selling costs and the sales of a company which has supplied us with the following statistical information:



Figures 10, 11, and 12. These three figures show different ways of analyzing the same facts. Figure 10 gives a graphic picture of the extremely rapid growth in sales and in selling costs, but gives little basis for even estimating whether expenses have increased more rapidly than sales. Figure 11 reassures us on that score, for it shows that the total selling expense and all the costs that enter into it except the direct-sales cost have increased less, proportionately, than have sales. This chart, however, does not show accurately what proportion of the increased efficiency in sales is due to lower advertising and what to lower overhead expense. Figure 12, in which the original data are plotted on ratio paper, shows all these relationships. All possible comparisons can be made directly by merely comparing the slopes of the respective curves, since the slopes show the *rate of growth.*

Year	*Sales*	*Advertising*	*Direct Selling Cost*	*Selling Over-head*	*Total Selling Cost*
1922	$ 85,000	$17,000	$13,500	$3,500	$ 34,000
1923	115,000	16,500	21,300	3,500	41,300
1924	190,000	25,000	31,700	6,000	62,700
1925	360,000	47,500	63,000	8,500	119,000

Figure 10 shows these statistics charted in the usual way. Growth has been rapid. All three divisions of selling costs have increased considerably. Have the costs been kept down so that the selling effort is increasingly efficient? It is impossible to tell from this chart.

Figure 11 is an analysis of selling costs shown as percentages or ratios of sales volume. It tells an interesting story; we see that the relative sales expenses have decreased for two years and remained stationary the last year. It shows that this has been due largely to the decrease in the ratio of advertising to sales, notwithstanding an increase in the ratio of direct-selling expense to sales.

Turn now to Figure 12, where the actual figures and not a series of percentages have been plotted on ratio paper. Remember that here we are interested in slopes and not in distances above a base line (there is no zero line on ratio paper). We instantly see several relationships which were hidden before. Notice the sales manager's salary, the "selling overhead"; in Figure 10, this item seems to remain almost unchanged—an illusion caused by the extremely small scale on which the curve is drawn. In Figure 11, the ratio of salary to sales seems to be decreasing much less rapidly than the ratio of total selling cost to sales. Figure 12 proves that this is not the case, and that, for the four-year period, the salary has increased at a lower rate than the total sales expense.

You can see this best by laying two straight edges across the chart, one touching the 1922 and 1925 salary points, and the other the corresponding total-cost points. Even in a chart drawn on so small a scale as this—actual charts are usually not less than 6 x 8 inches—you can see that the slope, and therefore the rate of increase, of the salary line is less than that of the total-cost line. You will find that the rate of salary increase is almost identical with the rate of increase in advertising cost—a conclusion you would not have reached from examining either of the other charts.

> **The fact that all rates of change can be directly compared, no matter what the character or the magnitude of the statistics, makes the ratio chart immensely valuable for practical control purposes.**

This form of chart is now being used for many of the statistical curves published by the government and by private and semipublic statistical organizations. It is also valuable in studying certain trends. Let us next take up, briefly, the charting of trends.

CHARTING TO REVEAL TRENDS

Simple scrutiny of almost any curve on a historical chart covering a number of years, will usually reveal that, thruout the detailed up-and-down movements, there is a rather steady increase or decrease. This basic movement is the general *trend* revealed by the curve.

From the long-run viewpoint, perhaps the most important way in which charting serves management is by revealing the trends which are being manifested in the business world and also the trends of progress in the particular businesses in which we as individuals are interested.

> **A comparison of trends in our own business with the trends in other businesses and for business in general, tells us whether we are leading the procession, merely keeping up with it, or lagging behind.**

Suppose, for instance, that we are in the cement industry. The U. S. Census statistics show that the output per man has been steadily increasing—largely because of improvements in machinery. During the War period, output slumped, but this was merely a temporary retrogression; since then the trend of output per man has again been upward. This, by the way, has been true of almost every industry.

Practical Application of Trend Comparisons. Now it is clearly possible to plot a curve for our own figures of output-per-man alongside the general curve for our industry. The two curves are not likely to coincide; ours may be consistently lower—which may or may not be important. The important thing is a comparison of the *trends* of the curves. Is our increase in efficiency greater than the average? Then we may expect to hold our own with competition. Is it less? What conclusion is then possible?

This is but one illustration of the use of trend-curves in the control of a business. Others were discussed in Executive Manual 3, and in many of the succeeding manuals, where the basis for and the usefulness of these general business trends have been analyzed.

You will recall that general business trends—resultants of business and economic forces—show such consistency of progress that business men are warranted in drawing the trend curve a little ahead of the present into the future. Then, if the sporadic and seasonal variations in each month's new data can be smoothed out, if the real forces at work in a business can be made to appear on the chart, the current trend of our particular business can be compared with the curve of past progress and with the general trends. This will give us a remarkably accurate check on the soundness of the general policies of our business and the efficiency with which our policies, if sound, are being carried out.

It is with the charting of trends which exist in all business curves that we are interested here—how to draw the curves of these trends and how to interpret them.

Freehand Charting of the Trend Curve. The simplest way, and in many respects a very satisfactory way of drawing the trend-curve for a business, is to sketch it in free-hand after having carefully studied the plotted points of a simple line curve showing monthly or yearly data.

If one curve alone is shown on the chart while this is being done, if the fluctuations are not wide, and if the draftsman has good judgment *and no bias*, the free-hand method will give results that are accurate enough for most purposes of control. This degree of accuracy is much increased if copies of the original chart are given to three or four people of good judgment and their curves are compared and averaged.

Removing Seasonal Variations which Obscure the Trend. In most businesses there are seasonal variations which cause the monthly data to swing up and down in rather wide cycles which are hard to average out by eye. These seasonal variations can be rather easily ironed out of our curve, making the trend much more apparent. How is this done?

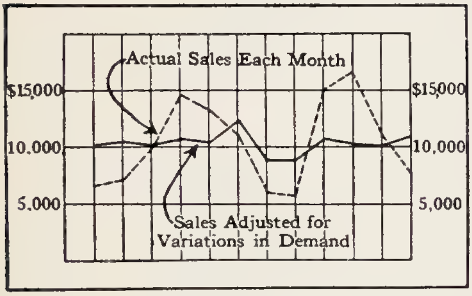


Figure 13. Sales adjusted for variations in the seasonal demand. The actual sales for each month are divided by a factor which represents the relative demand for the month. When the results as plotted show a straight horizontal line, sales are normal. Any deviations in trend should receive immediate attention.

In the table shown in Figure 5 of the preceding manual, there is a list of percentages of monthly sales, shown for a series of years. The dotted line in Figure 13 shows actual monthly sales for 1925; also, by the heavier line, the relative sales per month are shown as adjusted to the normal demand per month. In the drawing of this curve, use was made of the series of monthly percentages of annual sales which were derived from the table shown in Figure 5 of Executive Manual 76. The following procedure was used:

Take January, 1925. Sales that month were $6,765. The month should normally bring in 5.6 per cent of the year's sales; 5.6 per cent during one-twelfth of the year (.056 ÷ 1/12) is .67 times as much as may be expected during the average month. To compare this month's sales with the sales for other months, we may divide

$6,765 by .67 and plot the result—10100, which is a form of index number representing sales adjusted by a percentage based on the relative normal demand of this month. All the other months' sales are reduced to an index number in the same way. If the variations in sales have been normal and the business is growing normally, the chart of these indexes will appear as a straight line.

A curve thus plotted has obvious value in the control of sales activities as well as in the determination of the current trend. It shows the trend of sales in relation to normal expectations.

A plan exactly similar to the one just described is followed in determining what may be considered as normal monthly variations in production and in labor turnover, in accounts-receivable turnover, and in the many other variables which change with the seasons of the year.

Mathematical Methods of Determining Trends. There are mathematical methods by which lines can be drawn which give the exact mean of the statistics that are being studied. The square-root-of-the-mean-square method is not hard to work out; it plots a straight line which is an exact straight-line trend for these statistics. But many phenomena cannot be accurately represented by a straight-line curve. Other and much more complicated computations are used to work out the curved lines which better suit the trends back of some very usual types of phenomena.

For usual business purposes, involved mathematical processes are not necessary and are little used. One of two methods is usually sufficient to disclose any trends that cannot be disclosed by free-hand sketching. These methods are:

1. The plotting of the data on ratio paper.
2. The plotting of a moving average.

Ratio Paper and the Law of Growth. It isn't often that you find a company doing a business of $10,000 one year,

$12,000 the next, and $14,000 the next, $16,000 the next, and so on; that is, adding exactly the same amount of new business each year. Instead, we usually find that the annual sales grow in some such order as: $10,000, $12,000, $14,500, $17,500, $21,000, and so on. Thus, growth rarely follows a simple arithmetic progression. In fact, logic suggests and statistics bear out the fact that—

> **Normal growth is based on a more or less constant rate of change rather than on a constant amount of change.**

The business that is growing normally is more likely to add 5 per cent—or 10 or 15 per cent—each year to the preceding year's business, rather than $10,000 each year to the business of the year before. A company which does not increase the amount of new business year by year may be said, in a way, to be going backward. It is not following the law of growth:

> **The law of growth, when operating in a business, means INCREASE in annual additions of NEW business—not merely a gain in sales from year to year.**

You will recall that when charts plotted on ratio paper show a definite slope, this indicates a definite *rate of change.* Clearly, therefore, when a business is growing normally, the curve of the annual sales or of the annual production, when plotted on ratio paper, should be practically a straight line. And such it will prove to be.

Here, then, is an excellent way of determining the trend of growth of a business. The curve of growth when plotted on ordinary chart paper is likely to be a rather irregular curve moving upward on a rather ill-defined path, the trend of which is hard to determine. Now plot the same data on ratio paper. The irregularities are smoothed out and the points group themselves just above and below a straight line or a slowly bending curve which gives us the true rate of growth for the business.

The chief statistician of the Federal Reserve Bank of New York makes this interesting observation:

> In our work at the Bank, we have had much reason to study attentively these normal rates of growth. It is quite astonishing to find how characteristic they are of the different industries and different lines of trade, and even such things as the growth of bank deposits, money in circulation, and numerous other fluctuations of the modern economic world. They are so characteristic, in fact, that very often a log chart [a ratio chart] with the figure for the average rate of growth in, let us say, the last twenty years, will suffice to identify the subject of the curves without further label.

And knowing the rate of growth or trend of the industry and the rate of growth or trend which our own business has shown thus far, we can determine the reason or reasons for any variation, and shape our policies and plans for the future accordingly.

The Moving Average as a Means of Control. As the ratio chart discloses the trend of the growth of a business and assists in making long-view policies, so the annual moving average is the most generally useful means of watching the month-to-month results of the current activities of a business.

> **Moving-average curves show actual current trends by eliminating the effect of seasonal variations, and by minimizing the momentary effect of unusually good or bad months, without in the least ignoring the real effects of these high and low points.**

There are obvious uses for control purposes in curves such as this, in which each month's records are constantly adding to the picture of the current trend and keeping it up to date.

How to Compute a Moving Average. How is this useful curve drawn? An example will be the best way of making the explanation clear. In this case also, we shall use the data on which Figure 5 of Executive Manual 76 was based, and which we used in drawing the chart in Figure

13 on a preceding page. These data are shown in the following table:

SALES BY MONTHS

	1922	*1923*	*1924*	*1925*
January	$ 49,530	$ 69,410	$ 45,170	$ 67,650
February	103,120	67,390	51,210	71,490
March	45,770	75,520	90,190	99,210
April	94,130	96,170	123,490	145,220
May	91,260	122,160	114,110	135,390
June	30,660	61,530	76,750	109,120
July	21,290	71,380	75,470	61,440
August	33,170	47,660	91,060	58,860
September	72,610	108,140	137,670	149,130
October	95,020	126,990	147,180	166,330
November	65,430	89,250	99,250	110,270
December	85,820	53,520	77,930	79,040
	$787,810	$989,120	$1,129,480	$1,253,150

The average month's business for the year ending with December, 1922, is $787,810 ÷ 12, or $65,650. Adding the sales for January, 1923, to 1922's total sales, and subtracting January, 1922, sales, we find the total sales for the year ending with January 31, 1923; the average month's business for that year is $67,310. We now plot these two points on our chart. So we proceed—adding one new month's sales to the total for the preceding twelve months, and dropping the sales of the corresponding month of last year, and then dividing by 12—until we have brought our curve up to date.

Following are the more practical points to bear in mind about moving averages:

1. Seasonal variations are eliminated by moving-average curves, because each period that is averaged includes all the year's seasons, good and bad.
2. We must have complete statistics for a full year before our curve begins.
3. Minor dips and rises in the curve may mean that a particularly good or bad month of a year ago was dropped from the period that is being averaged; or they may mean a particularly bad or good new month. (Notice how the

point plotted for February, 1923, was affected by the abnormally large business done during February, 1922). Minor fluctuations may therefore mean little. It is the broad trend that should be watched.

4. When the curve is located on the chart with the latest point charted on the vertical line representing the latest month—as is usually done—direct comparison should not be made with curves plotted on the usual monthly basis.

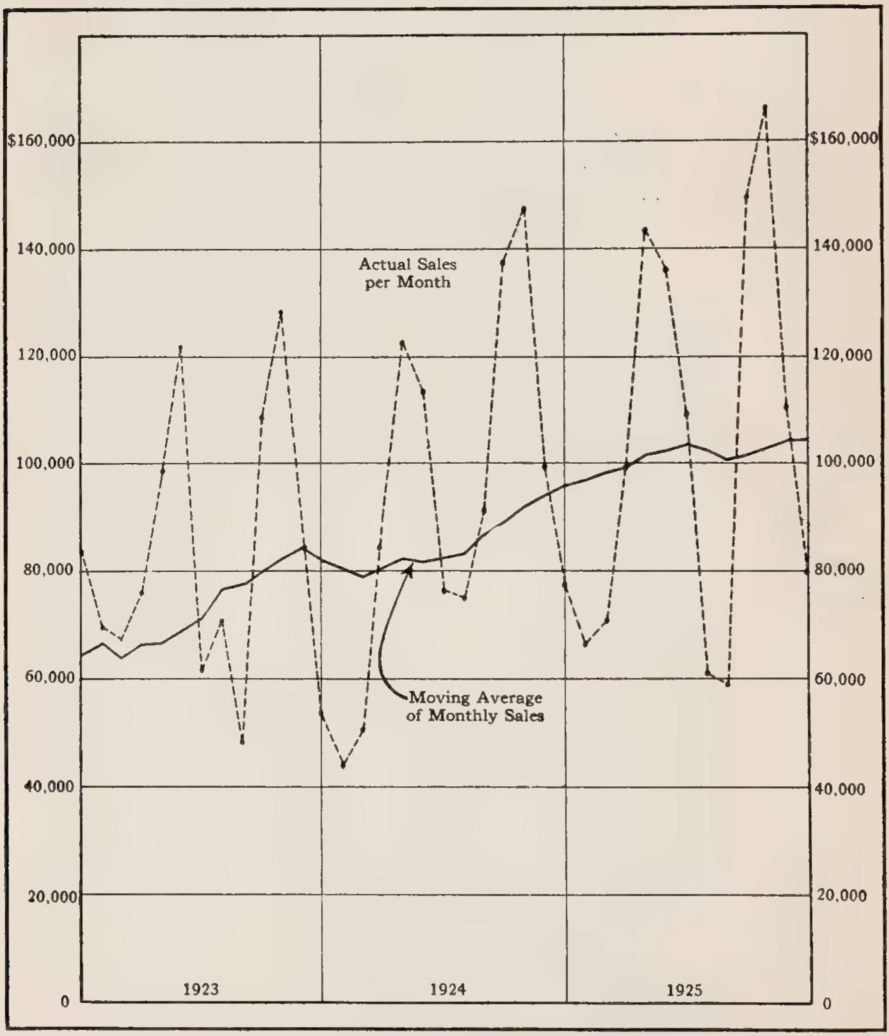


Figure 14. The moving average. The chart shows actual sales each month in a business in which the seasonal variations are rather pronounced. In the moving-average curve these variations are eliminated, and the trend of month-by-month growth is made evident.

When such comparisons are to be made, the moving average curve should be "centered"; that is, the average for each twelve-month period should be plotted between the sixth and seventh months of the period. If this were not done, the trends of certain of the variables charted monthly would apparently lead the more slowly responding moving-average curve.

* * * * * *

The subject of statistical charting is as broad as it is important. The executive who wants more than a working grasp of the subject as presented in preceding pages can now find some excellent books which cover the subject in great detail. But preceding pages present the more important methods of presenting statistics and preparing charts which aid management in its control of the business. The problem that follows brings out the more important points and gives you experience in this phase of statistical control.

The next manual, dealing with the reports an executive requires, will aid us in deciding just what records, what statistical comparisons, and what charts will be practical and helpful in the control of a business.

CHECK-UP ON PRINCIPLES

Use the following check-up to get the principles of this manual firmly fixed in mind. This will help you to handle the problem which follows. This check-up is entirely for your own personal use, so you need not send it in to the University.

---

1. An auditor is planning the form on which are to be made monthly reports on the status of the appropriations that have been budgeted for Plant and Equipment. There are to be thirteen columns with the following titles. In what order would you arrange these columns?

......Appropriation number.
......Original amount of appropriation.
......Period for which appropriation is made.
......Uncompleted balance of contracts made which are to be paid from this appropriation.
......Undisbursed balance in appropriation.
......Cash already disbursed.
......Accounts payable charged against appropriation.
......Balance available for future contracts.
......Name of appropriation.
......Per cent of completion of appropriation period.
......Supplemental appropriations.
......Cuts in appropriations.
.....Total approved appropriation.

---

2. The Gordon-Griffin-McBride Agency do an extensive fire insurance business. Their agency places insurance for a large number of merchants and manufacturers as well as for an even larger number of owners of homes and apartment buildings.

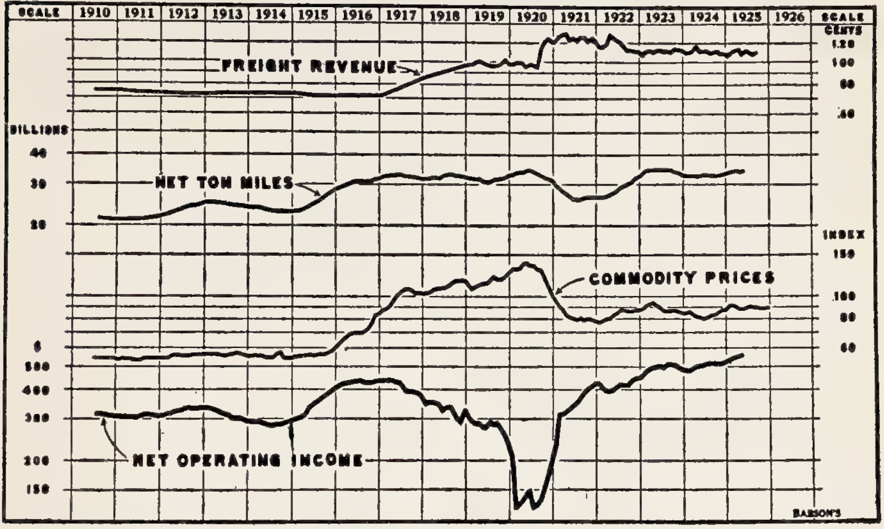
Their accountant is planning to give the partners monthly financial reports which will include all really useful ratios. Which of the ratios listed in the closing pages of Executive Manual 72 should be listed each month?

Balance-Sheet Ratios—1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐
Profit-and-Loss Statement Ratios—1 ☐ 2 ☐ 3 ☐ 4 ☐
Cost-Accounting Ratios—1 ☐ 2 ☐ 3 ☐ 4 ☐
Ratios between Balance-Sheet and Profit-and-Loss Items—1 ☐ 2 ☐ 3 ☐

---

3. This chart and the comments below it appeared in the *Babson Barometer Letter* of January 19, 1926. It is, as you can see, drawn on ratio paper. Does this chart justify the conclusions that are drawn from it? Yes ☐ No ☐

RAILROAD EARNINGS (Class I Roads)



Freight Revenue: Revenue per ton-mile (actual).
Net-Ton Miles: Net tons carried one mile (12 months running average, centered).
Commodity Prices: Fisher-U. S. Department of Labor wholesale price indices on a 1919-23 base (actual).
Net Operating Income: Net operating income per mile (12 months running average, centered).

Chart Shows the Picture of Railroad Earnings. From the chart above one can see very clearly the generally inverse relationship between railroad earnings and commodity price levels. During the time when there is little change in commodity prices the curve of net earnings per mile reflects directly the changes in total volume of freight carried. Note, on the other hand, that from 1915, notwithstanding the increase in volume of freight and also in the freight rates, net earnings of the railroads declined because of the tremendous increase in costs. Today, however, commodity prices and costs are at a lower level and volume of traffic is very large. Moreover, no general reductions in freight rates are impending. Hence it is quite obvious that the railroads this year should make a good showing. We expect them to be in a better position than for the last ten years to make purchases for needed improvements.

Executive Problem 77

HOW CHARTING SPOTS TROUBLE

The Bleekman Auto Sales Co. wanted money. They had been selling Ottawa cars for seven years, and had built up quite a business. They had started in rented quarters, but now owned a sales and service plant which they had built to suit their needs. For three years previous to 1925, they had paid dividends of $6,000 a year.

In January of 1926, the two Bleekmans, who were the officers and majority stockholders of the corporation, asked their banker to increase their line of credit, and admitted that they planned to use the loan in part to pay dividends. When the banker asked for their 1925 profit and loss statement and balance sheet, they gave him the balance sheet, at the same time explaining that their sales had been nearly 20 per cent more than the previous year. They showed reluctance to give the profit and loss statement, taking the ground that the financial strength disclosed by their balance sheet and the undoubted added security of their personal indorsement warranted the credit for which they were asking.

The banker told them to come in next day for his answer. He then turned over the new balance sheet to the bank's statistician and asked him to use it, together with the other information in the bank's files, in making a study of this company's business, explaining that he felt these good friends of his were not getting the profits that they should, and that he hoped thru this study to show them where they were making mistakes.

From the statements and reports in the files, the statistician tabulated the information which you will find in the working paper. This he then proceeded to chart and to analyze.

You are to prepare these charts and make this analysis.

BUSINESS MANAGEMENT

CONTROL THRU REPORTS

—Being Executive Manual 78, on Accounting and Statistical Control, in a Complete Plan of Training and Service for Executive Work

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CONTROL THRU REPORTS

Part I

CONSTRUCTING USEFUL REPORTS

MANAGEMENT must have adequate information about the condition and progress of a business if it is to exercise effective control over all the activities that contribute either directly or indirectly to the making of profits. While this fact may be readily recognized, the "how" of getting adequate information is not always given the careful consideration it deserves.

> **Management cannot succeed in controlling the activities in its charge without regular, dependable, and properly organized reports on all these activities—reports in which the operational conditions, results, and needs are crystalized.**

The current facts which show whether profits are increasing or diminishing, whether company policies are being closely adhered to by the personnel, whether market conditions, production conditions, employment conditions, credit conditions are materializing as anticipated—these facts must be brought to the attention of the management in concise, well-analyzed reports so that it may know what is wrong and who is responsible for it; and also what is right and who is responsible for that. Such information condensed into relatively brief reports serves as the basis of higher executive actions.

How Reports Facilitate Internal Control. In our analysis of the problem of control thru reports, let us first note that there are three important facilitating functions which reports render to internal business control:

1. Reports are sources of compact information which the management requires to control the various activities of the business.
2. The preparation of a report—indeed, the very fact that a report is to be prepared—tends to intensify the feeling of

responsibility on the part of the executive who submits the report of those whose work has contributed to the results disclosed in the report.

3. Properly prepared reports enable management to show each executive and each worker to what extent he is meeting the requirements of his position, and also the relation of his work to that of the business as a whole.

We see, therefore, that—

> **Reports have a threefold value as a means of control, and a properly organized reporting system must recognize and develop all these values.**

That principle is a basic guide for decisions on all questions regarding reports intended for control uses, as we shall see later on.

Reports for Use Outside the Organization. Reports are used for another purpose—to supply information about the business to interested parties outside the organization. Income tax reports, financial statements submitted to banks and investors, and employment and production reports prepared for the U. S. Census Bureau are examples of reports for use by parties outside the business organization.

While these reports to outsiders and the reports for internal use have much in common, being based on essentially the same set of facts, their distinctive features are so important that we shall treat them separately. The first and second parts of this manual will be devoted largely to reports that are useful for internal control purposes, and Part III to reports for outsiders.

The Characteristics of a Good Report. What are the characteristics of a truly useful report? What standard shall management set for the reports prepared under its direction?

> **A good report conveys a complete and essential message in easily understood, concise, acceptable, and suggestive form.**

Every requirement in this principle deserves special attention. A good report is not merely a mass of figures; but it is a carefully planned and arranged digest of information—information that is of vital importance to those for whom it was prepared.

The story told by the report must be complete; there must be no "loose ends." If the report is to be used for making certain comparisons with the facts contained in other reports, these comparisons must be provided for in the report. If certain unusual factors have caused variations from normal, these factors and their effects should be brought out prominently for the reader's attention. Furthermore, a report should be so definitely labeled, dated, and keyed that its meaning will be clear at a glance to the readers for whom it is intended, without any detached supplementary explanation.

A report should be so planned that its message will be grasped with a minimum of effort.

The parts of the report should be arranged in logical order—just as financial statements and statistical tabulations must be divided and classified so that they can be more easily understood and interpreted. The written sections of the report should be couched in correct, forceful language. Illustrations should be used where practicable. The illustrations may well include charts and graphs which, as suggested in the previous manual, are means of conveying information in easily understandable form.

Reports are prepared to be read and used; yet a great number of reports are not even read. Where such a condition obtains, you may be sure that it is caused by one of two things: either the reports have no real message for those to whom they are presented, and therefore no reason for existence; or the reports are so mysterious, so garbled, or so voluminous that few readers will take the time to ferret out their real value.

A good report will instantly arouse interest and stimulate action.

How Appearances Count for or against a Report. A good report is always more than a complete, easily understood statement of worth-while facts. If a company were to send out its financial statement printed on cheap newsprint stock, the facts would be the same as tho a heavy bond paper had been used, but the impression given by the facts would not be the same.

The atmosphere created by the method of presentation has great influence on the reception given to a report and its message. Executives will admit this truth at once so far as reports for outsiders are concerned, but we are likely to ignore it when preparing internal reports. Yet a little "dressing up" may be the very means of gaining favorable reception for a report. Certainly attractiveness carries an invitation to the eye, and invests the report with "character."

A Good Report Is Suggestive. And finally, no report is really adequate unless it suggests some action. Now, this suggestion need not be put into words as a direct recommendation of action. It may, and often is, built into the very arrangement of the report. We have an example of this is Figure 1 of the preceding manual. There the very figure showing percentage increase in material cost is a spur to the purchasing department and to the general management to exert every effort to get the prices paid for raw material into a better relation to total costs. In fact, there is an incentive to action in each one of the comparisons included in that table.

The report of sales which the sales manager sends to a salesman contains, in the figures themselves, a suggestion of what management expects of him. These figures will show, say, his current sales compared with his best previous record, with his quota, or with the current sales of the highest salesman. These comparisons stimulate him to action. The tardiness report for the office workers suggests greater punctuality, especially if the departments are listed according to the records they have made.

> **A report so prepared as to suggest clearly and forcefully just where improvements may be made, tends automatically to bring about those improvements.**

A good report carries this suggestion of improvement not only to the executives but also to everyone who is in any way responsible for the conditions covered in the report. This suggestion comes with especial force to those who have had something to do with the actual preparation of the report.

This being true, we should inquire carefully into the question of who in the organization should prepare reports.

Who Shall Prepare Reports? When this question was considered by the earlier exponents of scientific management, they showed a tendency to consider the preparation of reports as one of the special functions of management, to be handled as far as possible by designated specialists. Certain executives in the accounting and statistical departments were considered report specialists; they studied the statistics of all the departments and prepared complete, scientifically arranged, and very accurate reports for the department heads and the higher executives.

But this plan did not work out well. The reports were adequate so far as their contents went, often more than adequate. The trouble was that none but a few of the higher executives got much good from them. The rest of the organization looked upon the reports as comments on their departments by critical outsiders rather than as records of the accomplishments of their departments.

Under the best management practice to-day, nearly everybody makes reports. Each worker "time stamps" his own "work tickets" for each job, or makes some other kind of daily or weekly report on his or her work. These records could often be prepared as easily by a department clerk, but that would be ignoring one of the most important values of reports:

The making of reports gives each worker a vivid idea of how much or how little he has done.

Salesmen, therefore, are asked to report the total of their orders for each day, the number of prospects and customers called on, etc. Stenographers are asked to count the letters written or the lines typed. Collectors are required to turn in weekly reports on the collections in their charge. Even the office boy must report on the number of letters mailed, and perhaps the number of callers guided to the right officials, and so on. Some managers have so high an opinion of the reflex control value of reports that they ask employes to make reports which are, in fact, rarely looked at, but which serve well in keeping the workers alive to the requirements of their jobs.

The principle just stated also applies to departmental reports. Department executives should have direct supervision over the preparation of reports for their departments. They will often require the co-operation of the office, of the accountants, and of the statistical department. But they should make the finished reports on departmental activities their own and submit them with their personal comments—as going to the higher executives from the department heads.

Reports from Management to Workers. Reports to individual workers should always come from their own department heads or thru their departments. If, for example, a salesman is not making his quota, this fact should be reported to him by his sales manager, not by the statistical or accounting department in whose hands the quota records may be kept.

There are some apparent exceptions to the above rule, because functional responsibility is not always centered entirely in a department head. The personnel manager, for instance, may be directly responsible for several personnel matters—such as the control of the tardiness factor. In such a case, tardiness reports could go directly from his department to the workers.

> **Reports may go directly to the workers from departments which have functional authority of any kind over them.**

The Reports of General Management. The general management will not only see summaries of the departmental reports, but it will also prepare reports of its own activities. It will have these reports prepared from the books and the statistical records, and from special researches which it causes to be made.

In many organizations the comptroller is specially charged with preparing "summary" reports that serve as a control and check on the departmental reports. Often also, many reports are prepared by a special statistical organization—reports which are valuable to certain departments as well as to the general management. Of course, all the reports to the employes as a whole, and also to outsiders, must emanate from, or at least be authorized by, the general management.

What Reports Are Needed? Harvey S. Firestone, in his business autobiography, devotes an interesting chapter to a description of the vast number of reports with which the Firestone Tire & Rubber Company supplied its executives in the halcyon "spare no expense" days just after the War. He tells of the time and expense that went into the preparation of these reports, and of the time the executives spent in perusing them. He then tells of the rigid economies that had to be put into effect during the early '20s, when the bottom fell out of the rubber and tire markets. There was neither time nor money for elaborate reports. Each of the few reports that were retained had to pass a searching test, and its contents were cut to the limit.

And then comes the surprising sequel that these few reports provided a more effective control than the elaborate system of the past. Each of these reports was so full of meat that the executives who received it took time to study it—not merely peruse it—and to use its comparisons and suggestions in controlling the work in their charge.

This incident from the experience of the Firestone Company suggests several principles which will help every executive in deciding what reports are needed in his department or his business. In the first place, let us remember that—

> **The cost of preparing reports is an overhead expense and should be kept to a minimum consistent with the needs for adequate control facilities.**

This may seem almost a truism, yet the Firestone Company's experience shows how important is the warning against building up a vast system of reports that eat into the administrative appropriations and clutter the desks of executives. "Will it pay?" That is the question to be answered whenever a new report is proposed. "Does it still pay?" That is an even more important question to be asked about every report that is being used for current control purposes.

> **Does it still pay? should be asked every six months regarding every report prepared anywhere in any organization.**

It Takes Time to Prepare Reports. Another important consideration in handling the report problem of a business is that it takes time to prepare reports—time which otherwise could be put in on more directly productive activities. A shop foreman cannot be teaching green workers or a salesman cannot be selling goods while writing reports. This does not mean, of course, that no reports should be required from these men or from other workers. It means, rather, that much thought should be given to the form and number of the reports called for.

A salesman cannot be criticized when he complains that all his evenings are spent in making out reports, because the credit department and the sales-promotion department are each demanding an elaborate report on every call he makes, and the sales manager also wants a full summary for each day's activities. The more this salesman accomplishes, the more time he has to spend in preparing reports. As a consequence, his efficiency as a salesman is impaired. In such cases a combination report may be developed, giving all the essential information for all three departments, and demanding much less of the salesman's time. In making his one report, he may also use a code of numbers which, when put into certain columns, convey as much information as complete sentences.

Limiting the Distribution of Reports. The time of an executive is valuable. If reports that come to his desk require a considerable share of his time for examination and study, they may impair rather than improve his effectiveness. The value of a report to an executive must obviously be greater than the value of the time required to absorb its message.

An excellent plan is to distribute each report regularly to only those executives who have a direct interest in it. Copies are kept on file for other executives who have an occasional need for it.

Limiting the Contents of Reports. There are two general rules which help much in determining what facts should be put into a report. As in the presentation of statistics or the preparation of charts, the primary guide to the make-up of any report is its purpose—a purpose which must be carefully defined. Facts should not be included merely because they are interesting—the test is, Are the facts useful? The first rule as to the contents of a report is, then, that—

> **A good report includes only what is now or will be useful, and not what may be useful.**

A report which includes all items which "may be useful some day" is usually too bulky to receive careful attention; it has the further fault of covering up the useful facts in a maze of detail.

The second rule is that—

> **Reports are essentially summaries; generally speaking, the more terse the summarization, the more effective the report.**

We have already seen that tables of statistics are often arranged with the summarizing figures first, for often these alone will receive the executive's attention. He wants to have the more detailed figures included, however, to assist him in analyzing and controlling any abnormal development which the summaries disclose.

So it is with reports. A good report will present first that summary of facts in which the intended reader will have the greatest interest. This summary will be accompanied by details which the reader may or may not find it necessary to study.

The reports that the general manager studies will usually begin with a sheet summarizing the operations of all departments, but they will include also a set of departmental report sheets.

These departmental summaries are used by the department heads in connection with sheets summarizing the activities of the groups within their own departments. The group heads, in turn, prepare and study these group sheets in connection with the records of the subgroups and of the individuals working under them. Thus, we see that the summarized reports are built up gradually from detail sheets, until we have the final summarization in the single report which the president lays before the board of directors.

In Part II we shall analyze the various reports which executives find useful, with a view toward gaining ability to select intelligently the reports which will give the most effective control of a business.

CONTROL THRU REPORTS

Part II

Reports Used as Controls

WHAT reports should be used in my business?

As an aid in answering this important question for any business, let us consider four tables of representative reports, presented in following pages.

In the preparation of these tables, the records of a large number of representative companies have been examined. Very unusual reports called for by unusual conditions have not been included in these lists, even tho they have proved helpful in controlling the particular businesses where they are used. Reports from the management to the men, such as the reports sent to each salesman concerning the results of his work, are also excluded. These four tables of reports are intended rather to show representative practice and to suggest the uses which management makes of reports prepared for control purposes.

How to Determine What Reports to Use. Naturally, few, if any, businesses have found it necessary to use all the reports that are listed in the following tables. The point is that some of them are being used or should be used by practically every business. And each one of them is being used profitably somewhere.

How can the business man determine how many and what reports are needed in his business?

As a first step, he must fully understand all the uses of reports as explained in Part I of this executive manual, and as also treated in Part II of Executive Manual 40. He can then go thru the following lists of reports and determine just what each report suggested would mean if used in his business.

In the case of every actual and prospective report, the big question is, Will it pay? As we know, some reports cost more than they are worth in the information they convey. It is better to be conservative than overoptimistic in answering the question, Will it pay?

In general, it may be said that—

> **In setting up a schedule of reports for any business, it is necessary to consider, first, what information and other values the proposed reports can bring to the management; next, how often each of the reports should be made, to be most effective; then, what it will cost in time and money to prepare and to study the reports; and, finally, which of the reports promise to have values sufficient to justify their preparation and use.**

In studying the analyses of reports concerning sales, production, financial, and administrative matters, as herein presented on separate pages, have your own business in mind, and use the rule that has just been given to determine whether the management of your business is receiving the reports that it should receive.

Sales Department Reports. In studying the chart of suggested sales reports, we must remember that requirements differ widely in different businesses. Daily reports of sales are always desirable in a retail business. Many merchants watch the daily sales reports carefully, analyzing them in accordance with the days of the week, the weather, the special offerings that are advertised, etc. In most wholesale lines, however, sales are best analyzed weekly or monthly. The principle to keep in mind here is that—

> **The shorter the period which is used as the unit in the control of sales activity, the more promptly can management take advantage of or correct any unusual tendencies which become evident.**

This period, however, can be made too short. It would be futile for a general contractor, for example, to make week by week comparisons of contracts secured; and in some businesses, such as shipyards, an entire year is taken as the unit in making sales comparisons.

SALES REPORTS

I. Daily reports.
   Yesterday's sales by classes of products and by districts; in retailing, by classes of merchandise and by departments.

II. Weekly reports.
   Summaries of daily reports; also sales by each salesman.

III. Monthly reports.
   1. Summaries of sales measured both in units and in dollars. These are accompanied by comparisons with past records and with quotas, and are analyzed by departments or classes of goods sold, by territories, and by salesmen.
   2. Gross profits, selling expense, and net sales profits, analyzed by departments or classes of goods sold, territories, and (often) by salesmen.
   3. Terms granted on credit sales; also turnovers of different classes of goods.
   4. Monthly and accumulated expenses compared with budget.
      (a) Sales department expense.
      (b) Sales-promotion expense.
      (c) Advertising expense.
   5. Analyses of merchandising expenses, ratios of expense items to sales, and comparisons with past records.
      (a) Salesmen's salaries, commissions, and expenses.
      (b) Departmental overhead.
      (c) Sales-promotion expense.
      (d) Advertising expense.
   6. Reports on related activities.
      (a) Unfilled orders.
      (b) Rejections by credit department.
      (c) Returned goods and adjustments.
      (d) Collection ratios and bad-debt losses.
      } Analyzed by territories and (often) by salesmen.
   7. Reports on competitive and general trade conditions, by territories.

IV. Quarterly, semiannual, or annual reports.
   1. Summarized statements and comparisons of monthly reports; these include comparisons with past history of company, etc.
   2. Statistical bases for determining quotas and budgets.

V. Reports on factors outside the sales department.
   (a) Competitive and general trade conditions by territories.
   (b) Competitive products, their advantages and disadvantages.
   (c) Products which it may be desirable to add to the line.
   (d) New marketing practices and ideas.

Most sales department reports are, essentially, progress reports. The management must know how the volume of sales compares with last year's results, with the quotas that have been set for the current year to date, with the sales of competitors, and with sales in kindred lines. All the factors that affect this progress must be watched, such as the success of each salesman and of each sales division, and the effectiveness of the sales-promotion work and the advertising. As we have seen in previous manuals, charts offer valuable aid in the study and control of sales activities.

Reports on selling expenses are also very desirable. Some sales are obtained only at so high an expense as to leave no margin of profits. This fact is coming to be appreciated more and more, with the result that cost-accounting reports on selling costs are being introduced where, previously, gross sales volume and gross sales expense alone were considered.

Notice that the list of reports includes analyses of gross profits and selling expense, according to territories and salesmen and also according to the classes of goods sold. This suggests further that analyses be made of the elements that affect expenses and profits, such as terms of sale, turnover, sales overhead of all kinds, credit losses, and various adjustments.

These analyses are designed to suggest ways of decreasing the ratio of *selling expenses to sales*, so as to leave a larger percentage of the gross profits as net earnings. From the standpoint of management control, they are just as valuable as the reports on sales volume, for they indicate the profitableness of items making up the volume totals.

The Reports Required for Production Control. In studying the list of production reports, you will notice that here, too, progress reports and efficiency reports are more numerous than any other. In the progress reports a new

PRODUCTION REPORTS

I. Daily or weekly reports.
  1. The number of men on the pay roll, by departments, and comparisons with standards.
  2. Absences, by departments.
  3. (In processing industries.)
    (a) Units produced.
    (b) Production data per unit.
      (Direct-labor hours, material used, etc.)
    (c) Shipments of finished products; receipts of raw materials.
    (d) Inventories.
  4. Status of production orders in process.

II. Monthly performance records.
  1. Volume of output by kinds of products and by departments; comparisons with past months, with quotas, and with delivery promises. (Progress reports.)
  2. Departmental costs, and comparisons with past costs and with budget.
    For each operating department.
    (a) Direct-labor hours and cost per hour.
    (b) Indirect-labor hours and cost per hour.
    (c) Quantity and cost of material used.
    (d) Quantity and cost of material produced.
  3. Costs per unit, or by jobs; comparisons with past costs, predetermined or budget costs, standard costs, and competitive costs. (Analysis of above into direct, indirect, and material cost.)

III. Monthly summary and analysis of idle time of men and of equipment; also study of losses thru rejected material.

IV. Monthly summary of purchases and analysis of purchase data, with unit costs and comparisons covering principal materials.
  (Study of price trends for principal materials.)

V. Monthly reports on total inventories; also on inventories of principal materials, goods in process, and finished goods; unfilled purchase orders; comparisons with past records.
  1. Turnover ratios on all inventories.

VI. Monthly analysis of manufacturing expenses, with comparisons.

VII. Labor data.
  1. Analysis of each pay roll, by departments, with comparisons. Analysis of labor turnover, by departments, and by causes.

VIII. Semiannual or annual reports on the condition and adequacy of the plant, the methods employed, etc.

IX. Annual report on burden rates.

element is stressed—performance on exact-schedule time. Executive Manual 37 showed why the meeting of schedules is essential to plant efficiency. From the viewpoint of general management, however, there is another important reason for keeping production on schedule: to keep faith with customers, to build good will by shipping goods on the dates promised. A good system of production-progress reports—which are usually prepared in chart form—keeps the management in control of this important business-building phase of production.

The section on principles of production stressed the usefulness of the various suggested analyses which give a control over the efficiency of production activities. As explained in that section, the making of frequent and regular check-ups on results accomplishes a twofold purpose:

1. The records stimulate the workers to do their best, especially when their compensation is increased as their efficiency increases.
2. Good performances are brought to the attention of management and are made the standards by which future performances are gauged.

It must be kept in mind constantly that—

> **The information conveyed by any reports derives its value from its use alone. Unless the reports lead to higher productive efficiency, their cost of preparation can not be justified.**

Take, for example, the reports from the personnel department. Whether the labor turnover is 25 per cent or 125 per cent may not be important—unless it appears, as it almost surely will appear, that the lower turnover means a lower unit-cost in manufacturing. Management wants reports which bring out such relationships clearly.

Financial Reports Used as Controls. In examining the table of reports that are useful as financial controls, notice the emphasis that has been put on reports which help to insure the management against the embarrassment of being "short of funds."

FINANCIAL REPORTS

- I. Daily reports.
  - 1. Yesterday's cash-in and cash-out and final balance. (Total, and by banks.) (By branches, in some cases.)
  - 2. To-day's cash requirements. (a) Expenditures, and (b) Obligations.
  - 3. Prices of marketable securities. (In some cases, a report on prices of collateral.)
- II. The immediate financial situation (at all times about one month ahead).
  - 1. Probable cash receipts. (Cash sales; collections; income from investments; notes payable to be issued.)
  - 2. Probable cash requirements.
    - (a) Determinable expenses and obligations. (Salaries, taxes, insurance, loans, etc.)
    - (b) Other budgeted expenses and payments. (Wages, commissions, advertising, etc.; current invoices for materials and supplies, royalties, etc.)
    - (c) Speculative or seasonal buying of material in cash markets.
    - (d) Dividends declared.
    - (e) Expansion plans. (Payments on contracts.)
  - 3. Contingent liabilities.
- III. The future financial situation.
  - 1. Schedule of financing requirements of year's operating budget. (Sales, expenses, production costs, inventories.)
  - 2. Schedule of expansion program.
  - 3. Schedule of stocks and bonds to be sold.
  - 4. The dividend program.
  - 5. Schedule of payments on or purchase of the company's bonds and stocks; sinking-fund requirements.
  - 6. The trend of the financial markets.
- IV. Financial analysis (monthly and annual, with comparisons with past periods and with standards.)
  - 1. Financial profit and loss.
    - (a) Discounts taken and lost.
    - (b) Gain and loss on investments.
    - (c) Interest and discounts paid.
    - (d) Turnover and cost of working capital.
    - (e) Cost of permanent capital.
  - 2. Financial data.
    - (a) Budget predictions and actual performance compared.
    - (b) Collection ratios with comparisons. (Percentage of loss, days outstanding, etc.)
    - (c) Other financial ratios.
- V. Departmental expenses analyzed and compared with budget.

Money is the lifeblood of business. A good credit standing will ordinarily assure plenty of funds, but not at a moment's notice. Successful financial management requires constant supervision over the in-flowing and outflowing funds, and over the inventories of cash and liquid assets which must be on hand to take care of to-day's and to-morrow's and next week's needs for cash.

And this careful foresight must extend farther ahead. Not only must a sufficient supply of operating capital be planned for the expected activities of an entire season or year, but provision must be made for the company's expansion and refinancing programs for a period of years ahead.

Looking far ahead to the future financial needs of a business is one of the primary reasons for having a well-planned system of financial reports.

Financial reports have other uses. The use of capital itself produces both profits and expenses. Both must be analyzed, so that the capital employed may be highly productive and its net cost as low as is consistent with efficient selling and producing.

A report of financial costs should be studied in connection with the profits which these costs may have made possible.

The increased cost of the capital which is tied up as a result of an offer of longer credit terms to customers, for example, may be more than offset by the decreased selling expense or the larger sales which result from this new policy.

You will notice also that many of these financial reports touch several departments. The budget reports, for example, are controls on all the budgeted activities as well as on the way in which these activities have been financed. The income and outgo of every department are reflected in the finances, and have their effect on the general financial reports. It is for this reason that so many of the reports of general management (shown in the final table) come from the financial records of the business.

Reports on General Operations and Policies. The reports which the general management receives should be designed to summarize the activities of all the departments of a business in such a way as to show the net composite results. As we all know, it is often possible for one department to make a temporary showing at the expense of another. The shop may, for example, supply cheaply made goods that "get by" under the guarantees, but do not give real satisfaction. Or the sales department may "load up" dealers regardless of the effect on collections.

General management aims to co-ordinate the work of all the departments. The reports it requires must show to what extent all the activities are keeping in balance and how well they are co-operating to produce the largest possible net profits. These reports must be constructed with an eye to the success of the business as a whole, and should reveal the extent to which each department is operating for the success of the business as a whole.

It is for these reasons that so much attention is given in the last list of reports, to the summarizing statements, such as condensed summaries of departmental activities, which provide for easy simultaneous comparisons; also the detailed profit and loss statements, the analyses of personnel efficiency and turnover, and all the management ratios by which unbalanced planning and unbalanced results are detected.

General management is also responsible for conserving and bettering the assets of the business as well as for supervising and co-ordinating its work. This explains the importance of the balance sheet, of the constant study of business conditions and of possible improvements, of the periodic stock-taking and appraisal of every asset, and of the prevention of losses by reserves and insurance of various kinds.

General Management Reports

I. Daily or weekly reports.
Condensed summary of the preceding day's or week's selling, production, and financial activities, and accumulations for the current month, with comparisons with last year and with quotas and budget.

II. Monthly reports (most of which can to advantage be presented as graphs:
1. Condensed summaries of sales, production, and financial monthly reports, with special attention to comparative figures and to ratios.
2. Detailed profit and loss statement for month, and for year to date, by months, with comparisons with last year.
3. Detailed balance sheet and comparison with last year to date, and with previous months of the current year.
4. Analysis of expenses of general administrative departments, and comparison with budget.
(Items included: salaries and expenses of general officials, of general office, legal expense, taxes and franchise fees.)
5. Analysis of personnel efficiency, turnover, etc.
6. Reports covering the company's expansion programs.
7. Special studies suggested by changes in conditions, possible improvements in processes or product, etc.

III. Annual reports, employing both figures and graphs.
1. Condensed summary of above monthly reports, with comparisons with past years of company's history, with general business progress, etc. (All management ratios.)
2. Annual audited balance sheet and income statement; also a study of:
    (a) Adequacy of all reserves.
    (b) Depreciation and obsolescence.
    (c) Appraisal of present-day values of all assets.
    (d) Adequacy of insurance carried.
3. Balance sheets, income statements, and other data arranged for use with:
    (a) Creditors and banks.
    (b) Tax-assessing bodies.
    (c) Trade associations.
    (d) Stockholders.
    (e) Employes.
    (f) The general public.
    } Graphic representation is especially useful here; also "sales dollar" ratios, etc.
4. Condensed data for next year's budget policy.

All these reports have another purpose also. They provide general management with the basic facts upon which it may build its policies and plans for future progress. Reports that are rightly prepared will suggest the correct paths along which expansion should proceed. They will show what new markets can profitably be opened, what products show the best margins, where moneys can most advantageously be obtained, what labor policy produces the most goods per dollar expended, what volume of inventory shows the most profitable turnover, etc.

Reports which measure the success of general management policies are reliable guides to the paths which future policies should follow.

General management often finds it advisable to inform the public regarding the affairs of the business. This it does largely thru reports. The uses of these reports and how they should be prepared are covered in Part III, which will complete our training in accounting and statistical control.

CONTROL THRU REPORTS

Part III

REPORTS TO OUTSIDE INTERESTS

EVERY business, as a member of a business community, depends for its success to a great extent on the way in which it is regarded by that community. The company that is rumored to be "skating on thin ice" financially is likely to find it difficult to close long-term contracts.

A company's reputation and standing depends largely on what it does and what is said about this. Friends and enemies, employes and stockholders, suppliers and customers—all are forming opinions and expressing them; and what they say depends very largely on what they know or hear about the business. When a firm refuses to give out any facts on which fair opinions can be based, it has only itself to blame if its reputation is dragged thru the mud as a result of distorted assumptions and misinterpreted half truths.

When Outsiders Do Not Know the Facts. A few years ago, the meat-packing industry had an unfortunate experience of this kind. The large packers had gone along "minding their own business," playing the business game under the same rules as other businesses were following, and asking only to be left alone. But suddenly they found themselves cartooned as rascals, denounced as extortioners, and the door to fresh capital shut in their faces. Expensive legal proceedings followed. Legislation which would have practically confiscated their plants was proposed.

All this furor was fomented by ignorance of the real facts in the case. The public knew what the packers paid for beef on the hoof, and what they asked for porterhouse steak. The amount of capital required in operating the business, the economic services performed by the business, and the small fraction of the selling price that represented net profit—such facts the packers had considered as "their own business."

Perhaps it was their own business. But it would have paid them well to have made these facts public property from the start, for in recent years the packers have made good headway in bringing the general public to a realization of the great value of their business to the public.

The American Telephone & Telegraph Company is a good example of what a virtual monopoly can do to insure a constructive attitude toward it on the part of the public.

The public standing of smaller and less-conspicuous companies also is likely to be affected by misapprehension regarding the facts of the business, unless they, too, make it a point to give out facts that insure a fair judgment of their standing and service to society.

> **In every business, large and small, it is a major responsibility of the management so to present the facts of the business as to give a fair picture of its policies and standing.**

So important is this duty that the reports which convey this information should always be prepared and issued under the direct supervision of the general management.

There are several different classes of reports which may be prepared for use outside the business itself, as follows:

1. Reports for Credit Purposes. Of great importance in the success of a business are the reports that go to bankers, trade creditors, and credit-reporting agencies. The general contents of these reports was covered in Executive Manual 51. The facts they contain are mainly from the balance sheet, altho additional statistical information and income-statement items are also often included;

these facts are usually presented on the prepared forms which credit grantors send out.

In preparing reports for credit purposes, the aim is to give the credit grantor in one report all the facts concerning the financial status and condition of the business that are necessary to enable him to pass judgment. As pointed out in the section on credits and collections, it is better to err on the side of giving more facts than necessary rather than too few.

A detailed balance sheet which the officers and directors of a business require as an aid in the control of the business is likely to contain particulars which would be confusing to an outsider. A condensed balance sheet is more likely to meet the outsider's requirements. Certain assets such as money spent on promising new developments, may have great value in the eyes of the insiders and but little or no value in the eyes of outsiders. In fact, it is usually desirable not to mention any assets that the outsider would be likely to discount as to value, since the discounting of any figures in a financial report tends to cause the report as a whole to be questioned. However, if certain real estate, for example, is carried on the books at a purchase-price valuation which is far less than the current appraised valuation, it is legitimate to show the appraised value on the financial statement issued to credit grantors.

> **A financial statement issued to credit grantors must contain a conservatively valued statement of all assets which it is desirable to disclose, and a frank statement of all the current and long-term liabilities, both direct and contingent.**

The answer to the question as to what information should be given out in addition to balance sheet items, varies in different lines of business. Some of the questionnaires sent out by creditors contain questions which it is unnecessary and sometimes undesirable to answer. In most cases, a condensed balance sheet prepared and certified to by a firm of certified public accountants accompanied by a statement of the volume of sales, insurance carried, etc., gives the credit grantors all the information they desire.

2. Reports to Tax-Collecting Bodies. Tax reports must be made on prescribed forms and in accordance with specific laws and regulations. There is, however, considerable latitude of interpretation regarding classifications and valuations. Very frequently the tax forms must be filled out with figures that differ from those shown on the books for items which are apparently the same. In preparing these reports, expert advice frequently proves profitable by preventing mistakes and overpayments.

It must not be overlooked that many of these reports for tax purposes are open to public inspection, and that interested parties, knowing this, frequently examine these reports for such information as they can gain from them.

3. Reports to Trade Associations. When members of an association combine in reporting certain statistical facts about their businesses, to be summarized and circularized by the association, the resulting averages, standards, and other facts about the trade or industry as a whole are very valuable to the executives of the member companies. The extent to which these reports could legally go was, for a long time, so uncertain that many businesses feared to use this form of control. Now, however, recent decisions of the U. S. Supreme Court have cleared this situation, as later explained in Executive Manual 100.

4. Reports to Regulatory Bodies. Some businesses, such as insurance companies, banks, railroads, and, in most states, public-utility companies, are required by law to file very complete reports with certain regulatory bodies. In many cases these reports require such specific and detailed information that it can be furnished only by specially arranging the entire accounting and statistical system so that all the facts called for on these report forms are sure to be available.

5. Census and Other Statistical Reports. The Government Census Bureau and various other governmental and commercial organizations ask for many facts which enter into general statistical reports. When all firms comply heartily and promptly with these requests, the general reports can be prepared promptly so as to be more timely and therefore more valuable.

6. The President's Report to the Stockholders. The by-laws of most corporations require that the president report to the stockholders annually regarding the condition and progress of the business. Such a report, whether required or not, is almost always given; altho often, especially in small corporations, the president's report is informal and is delivered verbally at the annual stockholders' meeting.

In the larger corporations, and especially where the number of stockholders is large, the annual report of the president is a very important printed document. It almost always contains a condensed balance sheet; it generally includes a condensed profit and loss statement; and it often includes other interesting statistical information. An explanation of the facts shown and an outline of the year's accomplishments and of the plans for the coming year are either appended or are interwoven with the statistical data.

Naturally, this report by the general management on its stewardship of the properties which the stockholders have intrusted to it, must be prepared with the greatest care. The stockholders should be given all vital facts as to the condition of the company. Their confidence in the policies which the management is pursuing should be confirmed and strengthened. They want to know that all the affairs of their company are being well handled.

If there are many small stockholders who, combined, have only a minority control and cannot say who shall manage the company, they should be served by reports from the management about the same as tho they did have control of the management; for their good will is a valuable asset; their ill will may wreck the company's reputation.

7. Reports to the Employes. The employes' interest in the company they work for should not be overlooked. They are bound to have opinions regarding its progress and policies; and they will usually get a one-sided view of only a few of the important facts in the business, unless the management makes it a point to supply them with facts about the business and to give them the right interpretation of these facts.

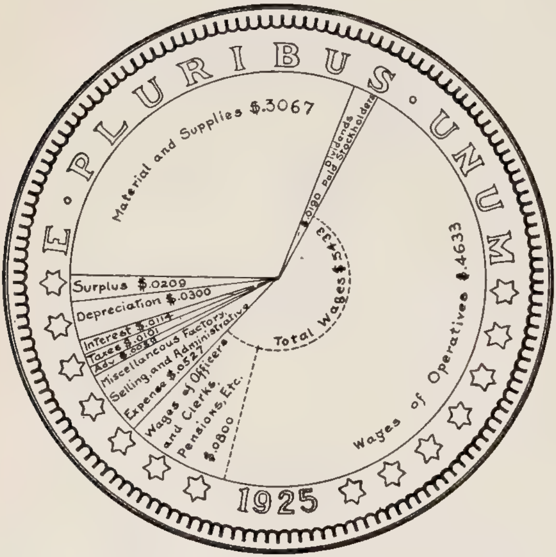
This is often done by distributing the president's annual report among the employes as well as the stockholders. Oftentimes, however, a more intimate report to the employes may serve the purpose better.

The primary interest of employes is in wages; they also want assurance of steady employment, and opportunity for advancement. The outside stockholders, on the other hand, are contented with a report that shows a good rate of earnings on their stock holdings. (If the rate of earnings is not good, however, this fact should not be hidden. Frankness is the right keynote in reports to both stockholders and employes.)

> **An analysis of the sales dollar is more suitable for a report to employes than is a profit and loss statement.**

Charting the proportions of sales income that were paid for materials, expenses, wages, and profits, visualizes the fact that wages are a large item as compared with profits. The "Sales Dollar" of a company which operates large foundries and machine shops is shown in Figure 5. This chart plainly shows that labor receives as wages half of every dollar the company takes in, while less than 2 per cent goes to the stockholders as dividends. Such a chart tends to banish loose talk about "50 per cent profits" and "slaving so that the capitalists may loaf."

8. Reports to the General Public. A wider public than is reached by the reports we have discussed thus far, can be apprised of the company's progress by reports which are mailed to all interested parties or are published in newspapers and financial journals, either as paid advertising or as news.



THE BLANCO SALES DOLLAR

Wages of Operatives	$.4633
Materials and Supplies	.3067
Wages of Officers, Clerks, Pensions, Etc.	.0800
Miscellaneous Factory, Selling, and Administrative Expense	.0527
Depreciation	.0300
Surplus	.0209
Dividends Paid Stockholders	.0190
Interest	.0114
Taxes	.0101
Advertising	.0059

Figure 5. A representative "sales dollar." Large blue prints showing this sales dollar were displayed thruout the shops and offices of a manufacturing company. This chart, without further explanation, told the employes just where the company's income was going, and demonstrated clearly that over half was being paid out as wages.

Whether or not it is worth while to reach this wider public depends largely on how direct and important is the relationship between the company and the public. A company whose stock and securities are rather closely held and whose direct customers are few—a mining company, for example — may find it quite unnecessary to publish any form of report to the general public. But if the stocks or bonds of a company are widely held, the security holders, their bankers, and their friends, are all interested in the progress of the company. This interest should be satisfied by a report which all can see, and from which all who are interested can inform themselves regarding the company's condition. This is especially desirable if there is any likelihood that the company will want to market additional securities.

Reports are issued for other reasons also. Every company has a large or small consuming public whose good will is important. Sometimes, as with the railroads and utilities, their customers must continue to buy from them whether they like it or not; yet any ill will on the part of these customers would be highly undesirable. Well-managed companies are eager to tell their public about themselves. It is a growing practice among business organizations to broadcast reports which tell just what service they are rendering to their community and the reasonableness of the price which the community is paying.

Other companies, and especially financial institutions such as banks and insurance companies, use their financial reports to advertise their financial strength. Companies which have securities for sale almost always include in the selling literature a report by the president and an audited balance sheet and statement of earnings.

Many other companies find it excellent good-will advertising to make all those who have any contact with them acquainted with their policies, their accomplishments, and their plans. This is often done by distributing copies of the president's annual report to a very large mailing list. These reports are, in many cases, attractively printed and illustrated; they are very informative and interesting, and are useful in giving a thinking public facts instead of hearsay on which to form its opinions.

Other companies accomplish the same purpose by series of advertisements. The Illinois Central Railroad, for example, publishes frequent interesting statistical reports, signed by its president, as advertisements in the daily press.

By means of such reports, management can to a great extent control its relations with the public.

Well-Planned Reports Insure Future Profits. In a system of well-planned reports, all the controls that are the result of careful accounting and statistical work come to a head. In fact, accounting and statistical work is done largely to supply figures for reports which give the executive a sure grasp on the facts of his business. He, in turn, reports these facts to others to give them that knowledge of the business which will command their continued good will and support.

* * * * * *

Next, after handling Executive Problem 78, we shall begin one of the most useful and, at the same time, most interesting sections of this training service. We shall increase our ability to write truly effective letters. This kind of ability has a high cash value in every business organization. It is essential in any person who would achieve outstanding success in executive work.

CHECK-UP ON PRINCIPLES

Use the following check-up to get the principles of this manual firmly fixed in mind. This will help you to handle the problem which follows. This check-up is entirely for your own personal use, so you need not send it in to the University.

1. It was generally believed among the clerks of the Biltmore Company that the daily reports which they made on their work were usually "filed in the waste basket" without being looked at. Does their belief make it useless to continue these reports? ☐ Yes ☐ No.

2. The auditor of the Gridewell Company is very zealous in checking up the expense accounts of the traveling salesmen. Whenever he finds an item which seems out of line, he takes up the matter with the salesman direct. Is this good practice? ☐ Yes ☐ No.

3. Senator Pepper of Pennsylvania complained earnestly against certain Government bureaus which have the power to require reports from railroads and utilities. He contended that they were prone to demand information for which the need was temporary; yet the reporting companies were compelled to continue furnishing the reports. As a result—so he stated—thousands of clerks were doing useless work at an expense of millions of dollars. Do you recognize the principles that seem to have been ignored by the Government bureaus? ☐ Yes ☐ No.

4. Can you, by referring to the table of general management reports on page 20, prepare a list of reports which the manager of the Bleekman Auto Sales Company (see Executive Problem 77) should receive and study? ☐ Yes ☐ No.

5. In preparing a financial statement for creditors should you include among the liabilities, claims for damages for which the company was not directly responsible, and which it is confident it cannot be compelled to pay? ☐ Yes ☐ No.

6. Take up any issue of any of the large metropolitan dailies. How many reports to outsiders do you find in it?...............

Executive Problem 78

A REPORT FROM THE PRESIDENT TO THE STOCKHOLDERS

John Brennan is confronted with a new and unexpected task. He has for the past seven months been the personal assistant of Charles Rietman. This position has brought Brennan new business experience every day, for Rietman is a shrewd and wealthy business man whose capital is invested in many enterprises. Among these is the Orange Taxi Company of Metropolis, of which he is president. He gives only a small portion of his time to this business, however, leaving the details of management to an efficient staff.

Mr. Rietman plans to present a report at the annual stockholders' meeting which can be printed and distributed among the stockholders. He therefore takes the reports which have been submitted to him by Mr. Smietanka, the vice president, who is in charge of securing concessions, handling claims, directing the advertising, and supervising the other public-relations work of the company; by Mr. Fowler, secretary and treasurer; and by Mr. Wolff, the superintendent. These confidential reports he brings to Brennan, asking him to use them in preparing the president's report to the stockholders. This report will be read by the employes and the taxi-using public as well as by stockholders, since the stock is distributed quite widely.

You are to act for Mr. Brennan in this problem. You will, therefore, give very careful attention to the summarizing sections of the reports which the president has handed him.

* * * * * * *

Mr. Rietman, President:

You ask me for a report on the year's work. Well, at least, we've had no strike this year, tho we came mighty near it when we refused to retain Mr. Epstein as attorney for Driver Kerren, who had carelessly run down and killed a child.

Fortunately, the men were divided on whether he should be defended; the older men were outspoken against him. I kept out of the mess personally and worked quietly thru these men; the agitation blew over. Since then, we have used the incident to get the men to favor the psychological tests for drivers; for Kerren could have stopped his cab and this accident would not have happened if his reaction time had been normal. We are getting a much safer and more contented lot of drivers, now that each man is required to pass the psychological test.

The agitation this year has sent our labor turnover higher than ever before—as you will see on the analysis sheet that is attached. The turnover during the last four months, however, has been lower than usual, and will, I believe, continue at this or an even lower level.

I suggest that certain additional personnel activities will help to make our workers contented. We should do more to get the men to buy stock; sickness insurance can be had to which we should contribute something; and we should arrange a few "get together" events, such as entertainments and picnics.

The statistical facts of the year's operations are shown in the table you receive with this. Notice that we are getting slightly more miles per gallon of gas, even tho the new cabs we bought this year are a little heavier. (The public shows a decided preference for these newer cabs.)

Notice also that the percentage of paid miles has increased. There are two main reasons for this—the longer average ride, and the more efficient dispatching system. Then, too, people are more frequently hailing cabs which are returning to their stands.

Operations in the garage have increased in efficiency, for we are operating twelve more cabs than a year ago, yet I have added but two men to the garage pay roll.

I. V. WOLFF, Supt.

* * * * *

Secretary-Treasurer's Report

I beg to report as follows:

1. The financial position of the company is shown by the balance sheet, which is attached as Exhibit I. The depreciation reserves appear to be adequate and are based on the same percentages used by most of the large taxicab companies. [This balance sheet is shown in the accompanying working papers.]

2. The attached profit and loss statement (Exhibit II) may be condensed as follows:

Total Income	$373,124.35	Income per mile	$.176
Expenses	349,762.43	Expense per mile	.165
Net Profit	$ 23,361.92	Profit per mile	$.011

Profit per mile has decreased 7 per cent since last year, notwithstanding the fact that paid miles increased to 53 per cent, compared with 48 per cent last year. Total miles increase from 1,793,000 to 2,120,000. The cabs in service have increased from 93 to 105.

3. The cash position of the company is such that for the next year practically all excess of operating income over operating outgo will be absorbed by payments on notes given for new cabs. No dividends can be paid unless moneys are raised either by borrowing or by the sale of additional stock.

4. Six hundred and seventy-one shares of unissued stock ($6,710) have been sold during the year to 103 new stockholders. Of these, 21 are our employes. Thirty-seven of our employes are now stockholders. This office has also co-operated with the Reinders estate in placing 1,175 shares of stock—most of which was sold in small blocks. A list of stockholders with the number of shares held by each is attached. (Exhibit III.)

G. T. FOWLER, Secy-Treas.

[Last page of report]

Summary

Reviewing the results of the past year and summarizing the preceding pages, you will find that—

1. The confidence of the public in the Orange Taxi service is shown by a patronage which has increased 17.1 per cent in number of rides and 19.5 per cent in revenue, compared with last year.
2. This is largely due to the co-operation of our entire organization in the "Safety and Satisfaction" campaign which has given the keynote to all our advertising, both in the newspapers and in the telephone books, and also in the leaflets which we have distributed.
3. Our increased business has been promoted by changes in our cab-stand concessions. As the attached list shows, the number has not increased but the business-producing value of our concessions is at present 12 per cent higher than it was last year. Two noteworthy additions to our cab stands are that at the Transylvania Depot and that at the Metropole Hotel, both of which are costing the company but a nominal rental. Most of the stands we lost were leased by our competitors at a figure higher than we cared to meet.
4. Our undertaking to save the Metropole Hotel harmless in the suit brought against it by the Okay Taxi Company for canceling the ten-year taxi concession, promises to cost us little. Our attorneys say that the Okay Company has no real ground for a suit, and that our legal expenses should be the only expense here.
5. Our relations with the city officials are very satisfactory.
6. Our relations with the local press are most agreeable. By placing stock with different members of the editorial staffs of these papers, we have assured ourselves a sympathetic attitude, which has benefitted us by keeping the Orange Taxi name in the background in cases of accidents where our cabs were involved.
7. Our relations with the insurance company which handles our claims have been satisfactory. We have co-operated with it in making settlements, and are in a position to expect a rather marked reduction in our insurance rates.
8. As a result of all the activities which are under my charge, the Orange Taxi Company is more firmly intrenched with the public than ever before. We are operating 105 cabs. All our competitors together are operating 123. From the statistics on the attached sheet, you will see why we have reason to believe that we are getting considerably more than one-half of the revenue paid by taxi-using patrons.

R. E. SMIETANKA, Vice President.